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**An investigation of third-year multimedia students' use  
of the web to supplement and enhance formal  
course work and skills**

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Dr Cheryl Brown**

## COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation for the work, or works, of other people has been attributed, and has been cited and referenced.

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Signature

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Date

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## Abstract

This study takes place against the backdrop of Marc Prensky's claim that today's young people are 'very much aware that if they actually want to learn something the tools online are available for them to do it on their own (2004:9). Many studies have shown, however, that despite the initial hype about how the world wide web would change learning, young people and especially students are not necessarily inclined to use the web for learning, simply because it is available.

In this dissertation, I investigate third-year multimedia students' use of the web to supplement and enhance formal course work and skills. The study investigates the use of the web for academic self-study that is *not* linked to direct assessment such as assignments. The dissertation is based on the premise that even where students choose technology as a career and have relatively good access to it, they do not necessarily make high use of it for learning. I argue that, apart from access, other processes such as self-regulation play a crucial role to ensure high use of technology by students when they have good access.

The main theoretical framework for this study is Albert Bandura's social cognitive view of self-regulation as it pertains to the use of technology by students to exercise personal control over their own learning. This agentic perspective of self-regulation implies that more than demographics such as a student's background or previous access to technology determine if and how students use technology. I argue that through the use of technology some students act as agents in the production of their own success, instead of merely remaining products of their social circumstances.

The research for this study falls predominantly within the interpretive paradigm. A mixed-methods approach was used.

**Keywords:** student web use, self-regulation, social cognitive theory, web access and use, self-study, agency, multimedia technology

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# Glossary of terms

**Actionscript:** A scripting language used in conjunction with Flash

**CMS:** Content Management System

**CSS:** Cascading Style Sheets. A language for defining the style of web pages such as font, size, colour, spacing, etc.

**Flash:** A tool that is used to create interactive and animated web sites.

**HTML:** Hypertext Markup Language. It is the language of the web and consists of a set of tags that are used to define the content, layout and formatting of a web document. Web browsers use the HTML tags to determine how to display the text.

**JavaScript:** A scripting language for the web. It is used to add functionality to web pages, validate forms and communicate with servers.

**PHP:** An acronym for Hypertext Preprocessor. According to w3schools.com, PHP is a server-side scripting language which is used to make dynamic and interactive web pages.

**MySQL:** An open-source database system (w3schools.com). SQL means Structured Query Language.

(Source: [www.w3schools.com](http://www.w3schools.com))

**Multimedia:** In this dissertation, the term ‘multimedia’ is used in relation to the multimedia technology course and the students enrolled in the multimedia technology course. For the sake of brevity, the course will also be referred to as the multimedia course and the students as multimedia students. The

multimedia technology course is described as follows in the course prospectus: The course 'is designed to provide students with knowledge and experience within the web development arena and applications of media aesthetics and professional practice required in the multimedia discipline'. The term 'multimedia' is therefore used as adjective in reference to the students and the course. The course includes, among others:

- Web design and implementation
- Web programming
- Database access and backend solutions
- Content management systems
- Digital image editing and composition
- Basic digital videography and photography
- Creative and graphic design concepts.

## Chapter 1

# Introduction

### *1.1 Rationale and background*

The research for this dissertation takes place against the backdrop of Marc Prensky's (2004:9) claim that today young people 'are very much aware that if they actually want to learn something the tools online are available for them to do it on their own'.

According to Prensky, students exploit online learning 'to the fullest' (2004:10). He says that young people learn less in school than they do after hours (2008:3-4), and that they are 'connected to the entire world around the clock, in real time, through their media and their myriad personal devices, both electronic (such as TV) and digital (such as the internet and cell phones)'. According to Prensky (2001:1), what young people do *outside* the classroom prepares them for 21<sup>st</sup> century lives and not what happens during school hours. Prensky refers to these young people as 'digital natives' as opposed to 'digital immigrants who were not born into the digital world' but became fascinated by technology later in life.

However, as Czerniewicz and Brown (2010:859) point out, there is 'no evidence to support the notion of a homogenous generation of digital students'. They found that in the South African context the term 'digital native' is only applicable to a small, elite group of students. In contrast, there exists in South Africa, a large group of young people who, although born into the digital age, show a 'serious lack of experience and opportunity using information and communication technologies'. They refer to this group as 'digital strangers'.

In the nineties and the early part of the new century, the internet was lauded as the 'Information Superhighway with enormous potential for learning' (Gray, 1999:122). Gray cites Pickering who argues that the "very nature of teaching may change from a teacher-dominated activity to a student-centred one... The formal curriculum will be replaced by a post-modern curriculum of the internet catalogue".

With reference to the initial enthusiasm about the world wide web, Selwyn, Marriott and Marriott (2000:167) quote earlier researchers as saying that the new Information Age is 'threatening the very existence of traditional higher education' and 'causing educators to rethink the very nature of teaching, learning and schooling' and 'that the learning resources of a college or university can be augmented by the learning resources of the web. Moreover, the web can help us re-focus our institutions from teaching to learning, from teacher to students'. Rogers and Swan (2001:1) also pointed to the interest among educators and psychologists as to how students can become resourceful and self-regulated learners through the web.

However, as Selwyn (2003a:5) points out, students are not necessarily inclined to integrate internet use into their studies. According to Selwyn, there seems to be little concern for the fact that students 'may not be inherently disposed to use ICT during their studies' despite the fact that it is now widely available on campuses. He states that there is more and more evidence that young people's actual uses of technologies remain more limited than the rhetoric around Prensky's claim suggests (2009:9).

In their studies on access to and use of information and communication technologies (ICTs) at South African higher educational institutions, Brown and Czerniewicz (2007:743) also found that high access to ICTs does not necessarily mean high use.

Bennett, Maton and Kervin (2007:9) point out that the debate about a new generation with sophisticated technology skills and preferences for learning through technology represents a form of 'moral panic' that is not backed up by empirical evidence. Sheely (2008:908-910) sketches how Prensky's 'digital natives' arguments became treated as a fact in disciplinary and public discourse alike, despite a lack of compelling evidence. He cites several researchers, such as Brooks-Young, Toledo, Oblinger, Robertson and Koohang and Harman, who merely adopted the 'digital natives' argument unquestioningly in their work.

In my work with third-year multimedia technology students I have indeed found that although this group of students chose a career in information technology, there are not only differences in students' experience with and exposure to technology, but also significant differences in how students, with or without experience, use the web for learning. I started suspecting that there are other factors that determine the use of the web for learning. I became particularly interested in those students who do not only use the web

for the formal part of their studies, such as assignments, but those who use the web extensively to supplement and enhance formal course work and skills.

Therefore, the aim of this study is to investigate factors relevant to third-year multimedia students' use of the web to supplement and enhance formal course work and skills. The term 'self-study' will also be used in this dissertation to describe the use of the web to supplement and enhance formal course work and skills. It should be emphasised that the type of web use under investigation for this research refers specifically to students' use of the web for study purposes that are **not** related to meeting the formal requirements of the course such as assignments and tests. This type of use is, therefore, not directly linked to work that will be assessed by lecturers but still refers to engagement with multimedia-related information found on the web. This type of use may refer to the downloading of tutorials to help a student understand class work better, reading or using web discussion forums for problem solving or the use of the web to help a student learn multimedia-related work that is not necessarily covered in the course. Students who engage in this type of web activity do so even when they do not have any work to hand in for assessment. It is, therefore, a regular activity that takes place over and above course work requirements and serves to supplement and enhance formal course work and skills.

The multimedia technology course is a three-year National Diploma course. The multimedia programme resides within the Information Technology (IT) department at a previously disadvantaged institution<sup>1</sup>.

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<sup>1</sup> The apartheid government classified the South African population in terms of four race groups: black, coloured (or of mixed racial origin), Indian and white. The black, coloured and Indian race groups are termed 'previously disadvantaged' in the post-apartheid dispensation following the first democratic elections in 1994 that included all four race groups. 'Previously disadvantaged' refers to the fact that apart from political disenfranchisement, less resources were allocated to people from the disadvantaged groups.

The course 'is designed to provide students with knowledge and experience within the web development arena and applications of media aesthetics and professional practice required in the multimedia discipline' (course prospectus).<sup>2</sup>

In order to pass the course, students need to use the web. They use the web to download a number of resources that they need to design and build websites. These range from downloading images for web design purposes to copying existing code for web development<sup>3</sup>. National Diploma students at the institution receive R50 worth of web credits but the third-year multimedia technology students get R200 worth of web credits in support of their studies, which signifies the importance of web use for students taking the course.

For the last five years, I have presented a programme called Work Preparedness Skills Development (WPSD) to the third-year multimedia students in order to prepare them for their practical or experiential learning period in industry and for the world of work in general. WPSD forms part of the subject Multimedia Practice III. I also place each student at a company for experiential learning during the last three months of their three-year National Diploma. In addition, I visit all the students at these companies to monitor their progress in the workplace. Students are generally placed at web design and development companies.

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2

- Web design and implementation
- Web programming
- HTML, CSS, PHP, JavaScript programming
- Database access and backend solutions
- Content management systems
- Digital image editing and composition
- 2D animation
- 3D digital modelling and animation
- Basic digital photography
- Basic digital videography and video production
- Non-linear digital video editing
- Basic audio editing
- Creative and graphic design concepts
- DVD authoring
- Multimedia CD ROM design

<sup>3</sup> This practice is referred to as opportunistic programming and entails taking existing code from the web or other programmes and copying it into one's own code. Web designers might also use existing design templates from the web to design their own websites.

In successive third-year multimedia classes over the last five years, it emerged from class and individual discussions that only a few students in each class use the web extensively for self-study to help them with their IT-based course. Others make more limited use of this tool for self-study and their academic web use focuses on course assignments. The students who told me that they were high users of the web for self-study were often high-achieving students, as was evident from their second-year marks. Individual discussions with students also suggest that it is not necessarily 'digital natives' or multimedia students, who grew up with computers and the web, who use the web extensively. Residential addresses and the schools that students attended show that many, if not most, of the students in each multimedia class are from lower socio-economic areas. When asking for a show of hands, it also emerged that only two or three students in each class over the last five years had access to the web at home. Yet, students with no exposure to computers or the web prior to their higher education studies, or students whom Czerniewicz and Brown call 'digital strangers' (2010:859) often told me that they spend considerable time on the web on campus teaching themselves new skills not covered in the multimedia course, or developing more advanced skills than those required to pass the course.

Furthermore, I have noticed that when the multimedia students have the time and opportunity to use the web, they do not necessarily do so, which is similar to Brown and Czerniewicz's (2007:743) findings that even when students have good access to IT resources, they do not necessarily use them optimally. I often look for students on campus to inform them of their interviews for experiential placement purposes, and have noticed that many students go home when their classes end early. When I visit the multimedia labs to look for students for these interviews, I also notice that many students are playing games, accessing social networking sites or e-mailing.

Apart from multimedia students' need to use the web for their studies, as pointed out earlier, the web is also indispensable once students enter the workplace. IT professionals – including web designers, developers and programmers – use the web to keep up to date with new technologies, help solve problems and for opportunistic coding or design, even though the latter practice is part of a vigorous debate in this particular field (Hartmann, MacDougall and Klemmer, 2009; Brandt, Guo, Lewenstein, Dontcheva, Klemmer, 2009; Saad and Zainab, 2004; Dorn and Guzdial, 2010).



Other researchers also point to the need for employees in information technology fields to become life-long learners. London and Smither (1999:3) emphasise the importance of self-development and continuous learning in the workplace in fields such as IT. In his 'search for the adaptable ICT student', Van der Vyfer (2009:19) found that ICT students do not fully realise to what extent they will have to constantly re-invent themselves in the workplace. Part of my duties in work preparedness skills is, therefore, to ensure that students understand that they would need to upgrade their skills continuously and also to use the web for problem solving when they start working.

Dunlap (2005:65) believes that educators should create learning environments that engage learners in ways that help them develop subject expertise, problem-solving skills, as well as collaboration and lifelong learning skills. This need for lifelong learning skills is regularly confirmed by employers when I visit each student during their experiential learning period. During these visits employers often tell me that problem solving and learning through the web is a necessary skill for IT professionals because they cannot necessarily go on courses to learn new skills or ask other colleagues for help with problems. In addition, many of the web designers and developers at companies have told me that they have no or very little formal training in the field and are self-taught. Dorn and Guzdial (2010:794) refer to an online survey of 300 web developers of whom nearly all respondents said that at least some of their programming skills were self-taught, and many of them said that they relied on online resources.

The need for self-development and renewal is described by Bandura (2001:1-2) in an article, 'Social cognitive theory: An agentic perspective'. He states that 'the capacity to exercise control over the nature and quality of one's life is the essence of humanness ... people are producers and products of social systems. To be an agent is to intentionally make things happen by one's actions... . The core features of agency enable people to play a part in their self-development, adaptation and self-renewal with changing times.'

Closely related to this agentic perspective is self-regulation, which forms the main theoretical framework for this study. Several studies describe the web as essentially a self-regulative activity (Corno and Mandinach, 2004; Rogers and Swan 2001; Hartley and Bendixen, 2001; Hargis, 2000; Joo, Bong and Choi, 2000; Williams and Hellman, 2004; Lewis and Mandinach, 2009).

Bandura (2001:11) mentions that the internet provides vast opportunities for students to control their own learning, and cites Zimmerman in saying that good self-regulators continuously expand their knowledge and cognitive competencies. He also points to self-regulation in the workplace, where knowledge and technical skills need to be updated to fit the new technologies and where employees have to take charge of their self-development.

In summary, despite Prensky's claim that 'digital natives' prefer to learn through technology, I have noticed that even students who chose technology as a career, do not necessarily make full use of technology for learning when they have relatively good access. In my experience, it is also often students who only started engaging with technology when they started their studies who make more use of technology for learning, in this case the web. Many of these students referred to as 'digital strangers' by Czerniewicz and Brown are from disadvantaged backgrounds and I started wondering why only some of these disadvantaged students fully exploit access to the web on campus for their studies, while others do not.

## ***1.2 Research questions***

Based on the rationale as set out in the previous section, this study will attempt to answer the following questions:

- (1) To what extent do third-year multimedia technology students use the web to supplement and enhance formal course work and skills?
- (2) Which of the following factors are relevant to third-year multimedia students' use of the web to supplement and enhance formal course work and skills:
  - a) Location and type of web access;
  - b) Demographic factors including age, schooling, years of experience, educational background of parents, gender and family support for technology;
  - c) Other factors which might influence web use, i.e.:
    - encouragement from lecturers to use the web;

- general use patterns which could affect the use of the web to supplement and enhance formal course work and skills, including the use of social networking and e-mail;
- direct assessment such as assignments attached to web use;
- multimedia students' attitude towards the web; and
- perceived ease of use.

(3) What role does self-regulation play in third-year multimedia technology students' use of the web to supplement and enhance formal course work and skills, especially in terms of:

- The role of motivation in self-regulated learning;
- Metacognitive processes; and
- Resource management processes.

### ***1.3 Summary of this chapter***

This chapter sets out the rationale for this study, which takes place against the backdrop of Prensky's claim that young people 'are very much aware that if they actually want to learn something the tools online are available for them to do it on their own'. However it is pointed out in this chapter that researchers found that not only do young people's access to and experience with technology vary vastly, but even those students who can be described as 'digital natives' do not necessarily use technology, or in this study the web, optimally for learning 'on their own'. My own experience showed me that even where students, such as the multimedia students, choose technology as a career, their use of the web for learning varies. The need for students and IT professionals to use the web was sketched, and the research questions set out. It is suspected that several factors, including access to technology and processes such as self-regulation, determine students' use of the web. Therefore, the overarching aim of this study is to investigate the factors relevant to third-year multimedia students' use of the web to supplement and enhance formal course work and skills.

## ***1.4 Summary of other chapters***

***Chapter 2*** provides an overview of the literature on web research and students' use of the web in general. It also looks at factors that could be relevant to multimedia students' use of the web to supplement and enhance formal course work and skills. Furthermore, it looks at a social cognitive view of self-regulation as a possible factor in third-year multimedia students' use of the web to supplement and enhance formal course work and skills.

***Chapter 3*** describes the methodology used in this research and looks at mixed methods research from an interpretive paradigm, and sampling as research type.

***Chapter 4*** consists of the findings of the research as it relates to the research questions, the overarching aim of which is to determine which factors are relevant to third-year multimedia students' use of the web to supplement and enhance formal course work and skills.

***Chapter 5*** includes a discussion of the findings of this research in terms of literature on access to and use of technology, and self-regulation.

In ***Chapter 6*** final conclusions are drawn and the limitations of the study are set out, as well as recommendations for further research.

## Literature Review

### ***2.1 Introduction***

In this chapter, I will provide, firstly, an overview of existing literature on web use to place the research for this dissertation in context. I will then look at literature on the use of the web by students in general, before reviewing literature on possible factors that might be relevant to student web use. Lastly, I will look at literature on self-regulation, which forms the main theoretical framework of this study on third-year multimedia students' use of the web for self-study or to supplement and enhance formal course work and skills.

### ***2.2 Overview of existing web use literature***

When reading for this study it appeared as if there is a paucity of research on the use of the web by students to supplement and enhance formal coursework and skills, i.e. on students' use of the web for academic self-study that does not have a directly assessed component such as assignments attached to web use.

As mentioned in the first chapter, there was substantial hype in the 1990s around the possibilities that the web would hold for education, and how it would change the face of education.

However, when looking at research on the academic use of the internet and the web, many of the studies focus on issues surrounding the use of the web and web-based technologies, such as learner management systems (LMS) and Web 2.0 technologies; and the jury is out on evidence that the web or technology has transformed education and students' actual learning.

Blin and Munro (2008:476) quote Selwyn as saying that there is a “growing need for the education community to account for the distinct ‘digital disconnect’ between the enthusiastic rhetoric and rather more mundane reality of university ICT use”.

They further quote Laurillard as saying that “we tend to use technology to support traditional modes of teaching – improving the quality of lecture presentations using interactive whiteboards, making lecture notes readable in PowerPoint and available online, extending the library by providing access to digital resources and libraries, recreating face-to-face tutorial discussions asynchronously online – all of them good, incremental improvements in quality and flexibility, but nowhere near being transformational” (2008:476).

This lack of transformational value seems reflected in the types of research on web and technology use. Selwyn (2008a:12-13) points out that much of the research deals with the *potential* of the web and other internet applications to support students’ learning but that ‘empirical studies of university students’ actual *in situ* uses of the internet as source of academic information are surprisingly few’ when compared to studies on internet use in school settings.

Several researchers such as Selwyn (2008a:12) and McLoughlin and Lee (2007:672), point out that much of the research in the use of ICTs are small-scale studies and experiments. Selwyn also mentions that many of these studies are discipline specific, which means that the findings do not necessarily apply to student web use in general.

In most recent years, Web 2.0 technologies such as blogs, wikis and social networking have led to a flurry of web research. A keen advocate of these technologies, Downes (2006:1) talks about the ‘new and newly empowered learner, the member of the net generation, who is thinking and interacting in new ways’. Much of the research on Web 2.0 technologies is justified by the rhetoric that argues that the ‘net generation’ or ‘digital natives’ demand to learn through new technology.

Countless studies have also been done on demographic issues surrounding web use (Selwyn et al., 2000 & 2008a; Hargis, 2001; Cotton and Jelenewicz, 2006). Other studies deal with students’ use of web material for assignments or assessed work, including the thorny issues of plagiarism and information credibility (Jones, Johnson-Yale, Millermaier

and Perez, 2008; Usun, 2003). Further issues that have been studied extensively include students' information-seeking and browsing behaviour (Pors, 2006; Griffiths and Brophy, 2005; Weiler, 2004).

A great deal of research has been done on web-*based* technologies and online courses, for example the use of web-based learning materials provided by lecturers (Kirkwood, 2007) and the use of learner management systems such as WebCT or Blackboard. Other research deals with online courses in distance education (Hoskins and Van Hooff, 2005; Cheung and Wang, 2005; Marchewka, Liu and Kostiwa, 2007, Shroff and Vogel, 2009).

The transformational quality of technology that Laurillard questions above could partly be related to the difficulty in measuring the impact of technology on learning and for this study, web use in particular. Griffiths and Brophy (2005:54) mention that web usage is difficult to measure because the web and the internet in general are not controlled environments.

Of greater importance for this dissertation, is research on educational processes required for web learning. A number of studies deal with the use of the web or the internet for self-regulated learning (Kirkwood, 2007; Hargis, 2000; Joo, Bong and Choi, 2000; Rogers and Swan, 2001; Banyard, Underwood and Twiner, 2006).

However, again this research often focuses on web-*based* learning materials or online courses and not on the use of the web to supplement and enhance formal course work and skills, or for academic self-study that is not directly related to an assessed component.

When looking at the mentioned research and available literature on web use by students, there doesn't really seem to be research which could backup Prensky's claim of how students 'exploit online learning to the fullest', especially after hours. As mentioned in the introduction, Prensky says that young people 'are very much aware that if they actually want to learn something the tools online are available for them to do it on their own'. Yet, research that they are doing it 'on their own' or how they are doing it on their own, is lacking. If anything, research shows that a substantial part of students' web use is not for learning, as will be shown in the next section.

### ***2.3 Student web use in general***

Because of the apparent paucity of research on how students use the web to supplement and enhance formal course work and skills, it is necessary to look at student web use in general to inform the first question of the research, i.e. to what extent do third-year multimedia technology students use the web to supplement and enhance formal course work and skills.

Czerniewicz and Brown (2009:9) researched ICT access among South African university students, and found that only 58% of students took advantage of the fact that they had high access to ICTs. According to them, this indicates that high access alone is not enough to guarantee high use. They also found that despite having good access, 44% of students did not make frequent use of ICTs for purposes of learning. Students from lower socio-economic groups made less frequent use of ICTs, even when they had high access.

Closely linked to research on internet and web use is the issue of students' academic as opposed to non-academic web use activities. Some studies indicate that students might not necessarily want to use technology in learning in the same way as they use it outside the education system (Lohnes and Kinzer, 2007; Cole, 2009). Selwyn (2006:257) suggests that the so-called digital divide between users and non-users of technology could very well be a decision not to use technology. He goes as far as saying that 'at the heart of the non-user debate is the notion of choice' (2003b:110).

Selwyn (2008a:13-17) also cites several studies showing that for students who have web access on campus, academic use of the internet is 'heavily entwined' with leisure uses and curtailed by matters such as cost and time, as well as relevance to specific course assessment requirements. In his study of academic internet use at UK universities, Selwyn found that academic-related information seeking was an important but not predominant part of the students' everyday engagement with the internet. Eighty percent of students reported using ICTs for sending or reading e-mails 'all the time', compared with 64% doing so for newsgroups, chatrooms and instant messaging, and 55% for social networking. Only 50% of students said they were looking for information about university studies or assignments 'all the time'.



Matthews and Schrum (2003:128-129) also found that most of the students in their study of high-speed internet access and academic gratification in college residences reported that the length of time spent using their computers for academic purposes was considerably less than the time spent on non-academic activities. One of students' most frequent uses was for personal communication including e-mail, instant messaging and downloading music, in that order. Some of their other popular activities included checking weather, news, sports, movie information and playing games online.

In a study at South African universities, Brown and Czerniewicz (2008:8-9) found that students' searching on the internet as part of course requirements was the most frequently undertaken ICT activity, which 55% of surveyed students said they were often doing. They also found that 42% of students reported frequently looking for lecture notes and presentations electronically, 38% said they were using online databases and 37% reported looking for course information.

Experts indeed thought that web-based technologies such as learner management systems and Web 2.0 technologies would have a great impact on students' education, but even here there is evidence that students do not necessarily use these affordances of the web, or use them as intended.

Brown and Czerniewicz (2008:11) found that as far as learner management systems were concerned, 33% of students surveyed said they hardly ever used the LMS, 31% said sometimes and only 36% said that they often use the LMS. Only 14% of students reported that they engage in activities related to Web 2.0 technologies, and 13% of students reported frequent online collaboration as part of the course. Seventy-three percent of the students surveyed said that they hardly ever keep a blog or journal as part of course requirements. The researchers point out that although these activities are considered to be on the increase, their findings are similar to emerging international research which shows that students are involved in 'social software practices in educational settings less often than is commonly thought' (2008:10-11).

In a study of first-year students at five English universities in 2008, Jones, Ramanau, Cross and Healing (2010:729) found 'a complex picture' of use. They found that some students made little use of new technologies while others made extensive use of them. They note, however, that 'often the use of new technology was in ways that did not fully correspond

with the expectations that arise from the ‘net generation’ and ‘digital natives’ theses’ (2010:722).

Of great interest for this research of students in an IT-related field such as multimedia technology is Brandt et al.’s study (2009:1) of how programming students use online resources. Although cut-and-paste programming is widely debated in online forums and blogs, the researchers describe their study as the ‘first strong empirical evidence of how programmers use online resources in practice’. The study looks at how 20 programming students ‘opportunistically interleave web foraging, learning and writing code’. The authors point out that programmers have often taken a ‘bricolage approach by tailoring or mashing up existing systems’. They search for suitable components and learn new skills in the process. The web has become an important source in this regard. Brandt et al. found that programmers use online resources ‘with a range of intentions: They engage in just-in-time learning of new skills and approaches, clarify and extend their existing knowledge and remind themselves of details not worth remembering’. They mention that web sources play an increasing role in problem-solving (2009:1).

Hartman, MacDougall and Klemmer (2009) also point out that the ‘web has fundamentally changed how programmers write and debug code’. They also refer to the use of the web for opportunistic programming and to programmers’ use of online forums and blogs to discuss coding problems.

The research mentioned above is only a small fraction of what has been done on web use. It, however, highlights one issue: although the original intention with providing internet and web access to students on campus might have been that they should use it for their studies, they do not necessarily use the resources optimally when they have access, and a great part of their web use is for non-academic purposes. For IT students, such as multimedia technology students, the web can be an important source of learning but is also an important source of code for programming purposes.

## ***2.4 Factors relevant to student web use***

An important part of the debate about access to and use of technology deals with the factors that could affect students’ use of technology, and, for the purposes of this study, their use of the web specifically.

Although not directly related to education, Hassani (2006:253) refers to six patterns determining online use: 'variations in the technical means' through which people connect to the internet; the degree of autonomy users have in terms of time and freedom; their level of skill; the nature, kind and level of social support (somebody to ask for help); the purposes for which people use the internet; and years of experience in using the internet.

Based on a large range of studies, Pors (2006:107) points out that the information behaviour of students in academic contexts are closely linked to, among many other factors: study subject and level of study; how teachers recommend and put forward requirements and demands; access at home or on campus; and the ease with which students are able to use the web.

After studying some of the research available on factors that might affect student academic web use, and taking into consideration the specific context of the multimedia programme as an IT-related course at a previously disadvantaged institution, I decided to investigate the following factors that might be relevant to third-year multimedia technology students' use of the web for self-study:

- Location and type of access;
- Demographic factors such as age, schooling, years of experience, parents' educational background, gender, family support for technology; and
- Other factors that might affect web use such as encouragement from lecturers, general use patterns such as social networking, direct assessment such as assignments attached to web use, as well as attitude towards the web and perceived ease of use.

One of the most obvious factors in the use of the web is the location where students have access to the web and the type of access that they have. In his study of UK undergraduate internet use for academic purposes, Selwyn (2008a:17) found 'significant' differences in terms of where students accessed the internet. He found that students with private access to their own computers were more likely to look for material about studies or assignments than students who accessed the internet in shared settings on campus.

Of the students in Selwyn's study, only 10% were restricted to accessing the web on campus. However, in developing countries such as South Africa, the picture is substantially different. As mentioned in the introduction, Czerniewicz and Brown (2010:859) found that the notion of 'digital native' only applies to a small, elite group of

students in the South African context, and that a large group of students rely on the provision of technology on campus. In this regard, their study at five higher education institutions in the Western Cape, found that 69% of students reported that their internet access on campus was adequate for learning. When it comes to computer access in general, their study found that students are constrained by lack of access at home. Sixty percent of the students surveyed at the five institutions were low users of ICTs for studies, a finding similar to what others have reported, i.e. that frequency of use is connected to home access, even when access at campus is adequate (Czerniewicz and Brown, 2009:5).

Many South African students without home web access now access the web through their cell phones. Czerniewicz et al. (2009:77) found, for instance, that the most frequent form of off-campus internet access for students from low socio-economic groups is through their cell phones. In their study at three South African universities, they also found that more than 98% of students had cell phones. In another study, Czerniewicz and Brown (2010:862) mention that double the number of South Africans access the internet via their phones than those accessing via fixed lines. The differences in internet access between developed and developing countries remain stark. It is estimated that only 13.8% of the total South African population had internet access at the end of 2010 (Internetworldstats, 2011), while in the UK, 70% of households already had internet access in 2007 (Selwyn, 2008b:6).

Much has been made of how mobile internet access would open new possibilities for learning through the web, especially in developing contexts. Research, however, shows that young people's most important use of cell phones is for social purposes.

In a pilot study of cell phone use among South African township youth, Kreutzer (2008:26) found that 71% of respondents accessed websites on a typical day. However, looking for information for school was only ranked 7th out of 11 variables for overall internet use. Fifty-nine percent of respondents indicated that they have 'ever' used the mobile internet to look for information for school and only 12% indicated that they used it the previous day. In the 'previous day' category, looking for school information ranked the lowest among the respondents' use of cell phone internet access. Similar findings emerge from developed countries. In Japan, entertainment-based internet access via cell phones represented 75% of young people's use, followed by e-mail and news (Gilham and Van Belle, 2005:477).

The research in this section therefore seems to suggest that lack of home access to the web constrains students' use. Certainly, in the South African context, cell phones have become an important way of accessing the web even if social uses of cell phones are most important for young people.

#### **2.4.1 Demographic factors relevant to web use**

As mentioned earlier in this chapter, substantial research has been done on demographic factors that could affect web use. For the purposes of this study, only the following demographic factors will be investigated: age, schooling, years of experience, parents' educational background, gender, and family support for the use of technology.

Despite Prensky and others' claims that 'digital natives', or the younger generation, are more inclined to use the web than older people, several studies have found that age does not play an important role in students' use of the web. In his study of internet use by undergraduates at a UK university, Selwyn (2008a:17-19) found no significant differences regarding students' age or even year of study. In a paper titled 'Debunking the 'digital native'', Brown and Czerniewicz (2010:357) also found that age is not a determining factor when it comes to students' access to and use of ICTs in general. Hoskins and Van Hooff (2005:188), on the other hand, found that the older students in their study were more inclined to use the web, although they felt that this finding could be related to the fact that these students had better access to technology at home. In their study of conditions at five UK universities, Jones, Ramanau, Cross and Healing (2010:726) found that it is not necessarily the *age* of the students that determines how much they use the web, but rather that students of different ages use the web differently. They also found differences in usage among the universities studied.

Another factor that could have an influence on students' web use, specifically in the South African context, is the type of school that students attended. Former Model C or traditionally white schools were much better resourced than schools for other population groups in South Africa.<sup>1</sup> Chick (1996:33) points out that despite efforts

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<sup>1</sup> Under apartheid, white schools were called House of Assembly or Model C schools, while schools in black townships fell under the Department of Education and Training (DET). Coloured schools fell under the House of Representatives (HoR) and Indian schools under the House of Delegates (HoD) (Soudien, 2004:98) Schools in previously disadvantaged areas were (and still are) hugely under-resourced in terms of money and staff.

by the apartheid government to put more resources into black schools in the last years of the dispensation, in 1986/87 the per capita expenditure for a black child was still only R476 compared to R2508 for a white child. The teacher-student ratio was (and still is) also hugely skewed. Van der Berg (2007:849) points out that, despite the end of apartheid education, the quality of education in former Department of Education and Training schools, or township schools, is still extremely poor compared with those in, for instance, former Model C schools. A report by the Equal Education movement (2010:3-6) also points out that little significant progress had been made with respect to the inequalities between schools in terms of infrastructure and learner performance. With regard to computers, for example, only 10% of 'ordinary public schools have stocked computer centres'.

A lack of access to computer technology obviously implies less experience. Several studies have found that students who regard themselves as less experienced also tend to use technology less. Stoel and Lee (2003:364) found that students with less experience of technology are less inclined to use learner management systems or other web-based technologies. In his study of undergraduate internet use at UK universities Selwyn (2008a:17) also found that students who regarded themselves as 'expert, very competent or fairly competent internet users' were more likely to indicate that they look for information for their studies on the web than were students who described themselves as novices. However, differences between the two groups were not found to be statistically significant.

A number of studies (Hassani, 2006; Williams and Hellman, 2004) found that educational background plays a role in internet use in that higher levels of education lead to a greater likelihood of internet use and different types of internet use. In a study related to computer access and use, Nakhaie and Pike (1998:434) found that the educational background of students' parents play a role in whether there is computer access and use at home. The higher the parents' educational qualifications the more likely the household was to have and use a computer. Williams and Hellman (2004:71) found that students whose parents had college education fared better in online courses than those students who were the first in the family to go to college.

With regard to gender, many studies show that there are differences in how male and female students use the web. Selwyn (2008a:17) found that female students were more likely to look for information about their studies than male students. Hoskins and Van Hooff (2005:188) in their study of online learning, however, found that male learners were more likely to engage in online dialogue than female students, but that there were no gender differences in the period of use, or the number of visits to the course websites. Jones, Johnson-Yale, Millermaier and Perez (2009:6) mentions that the literature generally suggests that females use the internet for communication and educational purposes more often than do males, and that males were more likely than females to use the internet for entertainment. They also cite literature that suggests that men and women use the internet for e-mail and academic purposes with the same frequency.

Access to social support networks – or lack of such support – can also affect the use of ICTs. Again, with reference to ICTs in general, Czerniewicz and Brown (2009:8) found that although students' peers and families placed equal value on ICTs for learning regardless of social context, students from high socio-economic groups had more access to supportive peers (52%) and family support (37%) than did students from low socio-economic groups. The latter group indicated that 38% of them had support from peers and 28% from families. Only 18% of students from high socio-economic groups said that their families were unsupportive, while 34% of students from low socio-economic groups said their families were unsupportive. Donat, Brandtweiner and Kerschbaum (2009) also found that if friends and family support the use of the internet, people are more inclined to use this technology.

#### **2.4.2 Other factors that might affect web use**

The literature suggests that several other factors apart from demographics might also affect students' web use. These include encouragement from lecturers, other use patterns such as social networking, direct assessment such as assignments attached to web use, as well as students' attitude towards the web and perceived ease of use.

Williams and Hellman (2004:78) point out that institutions, specifically their staff, can contribute to students' success with online learning, not only by integrating technology in courses but also in terms of providing multiple avenues for students who seek help. Siemens and Tittenberger (2009:28) argue that many younger

students prefer a balance between technology and face-to-face contact with staff. They argue that despite the fact that technology enables greater learner control and autonomy, students in general value social contact and direct staff guidance. Several other studies also point out that where lecturers integrate web use in academic work, use among students increases (Lee, Cheung and Chen, 2005; Matthews and Schrum, 2003).

There is increasing interest in and concern about how social networking and other social communication seem to affect students' web use for their studies when considering the amount of time that students seem to spend on these activities. Jones et al. (2009:13) found that nearly all of the American students they surveyed at 40 US higher education institutions spend at least one hour on the internet every day. A staggering 72% of them spend less time than that studying for their classes. Forty percent of the students said they used the internet most often for social communication and only 22% reported that they most often use the internet for work related to their studies. Thirty-six percent said that they log onto Facebook a few times a day. An ECAR study done in 2009 shows that 90% of the 30 616 American students surveyed use a social networking site (Caruso, Smith and Salaway, 2009:2).

Although it has been difficult to find statistics on South African students' Facebook use, one study shows that 33% of the four million Facebook users in South Africa are between the ages of 18-24 ([www.socialmedialogue.com](http://www.socialmedialogue.com), April 2011). In a study of 800 students at seven South African universities, Johnston, Tanner, Lalla and Kawalski (2011:10) found that the average South African student has between 100 and 150 Facebook friends. The researchers compared South African students to their counterparts at Michigan State University. Although the US students had 150 to 200 Facebook friends, 70% of the American students used the 'My Classes' profile on Facebook, compared with only 10% of the South African students.

A number of studies have found that direct assessment also affects web use. Research shows that students are for instance not necessarily keen to use Web 2.0 technologies unless they get marks for this use (Cole, 2009; Karasavvidis, 2008; Warren, 2008). In a study on the use of a learner management system by undergraduate education students, Karasavvidis (2008:198-201) found that students



adopted a 'course survival strategy' in the use of online resources, with many students not accessing additional resources.

In his research on online discussion forums, Warren (2008) found that these would not receive the same level of attention from students if the discussions were not assessed. He cites several studies that show that active participation in forums only occurs when use is compulsory and contributes towards marks. Cole (2009:142-144) made a similar finding with a wiki for students. Five weeks after starting the wiki there were no postings. The reasons students gave for not taking part in the activity included pressure from other courses, issues of self-confidence and ease of use, and a total lack of interest. Cole remarks that students prioritise their time according to the greatest perceived benefit, which in her study meant that deadlines for other courses and part-time work pressures received a higher priority. She also feels that promoting wiki activities requires an assessed element. Similarly, Kirkwood (2007:380) found that participants in a web use study reported the influence of assessment in determining which aspects of their course module received more attention. This also applied to the accessing and use of web resources.

A large number of studies has been done on how students' attitude towards the web and ease of use affect their actual uses. Donat, Brandtweiner and Kerschbaum (2009:51) found that a positive attitude towards the internet is an important determinant in internet use. Ease of use might also affect attitudes towards the internet and people are more likely to use the internet if they perceive it as easy to use. Liaw (2002:146) found that individual computer and internet experience, self-efficacy and motivation (including enjoyment and usefulness) play an important role in the individual's use of the web specifically.

In summary, the research above shows that encouragement from lecturers and other use patterns, such as social networking, can affect students' use of the web for academic purposes. The studies mentioned also show that students are more inclined to use the web and online resources if there is a directly assessed component attached to this use. Ease of use can affect students' attitude towards the web positively, and this could also increase use.

## ***2.5 Theoretical framework: The role of self-regulation in web use***

A number of the studies examined for this dissertation deals with the use of the web or the internet for self-regulated learning. However, again this research often focuses on web-*based* learning materials or online courses and not on the type of use studied for this dissertation, i.e. the use of the web to supplement and enhance formal course work and skills (Hargis, 2000; Joo et al., 2000, Rogers and Swan, 2001; Banyard et al., 2006).

This raises the question of whether the educational community should not pay more attention to the learning processes needed in the use of technologies such as the web, instead of focusing on issues such as the provision of technology or the use of Web 2.0 technologies such as wikis and blogs.

Hargis (2000:n.p.) argues that ‘it is a mistake to emphasise connecting schools to the internet without considering the kinds of processes students need in order to learn from the information they access’. This implies that merely giving students access to technology does not necessarily mean that they will use technology. One of the ‘processes’ that Hargis refers to is self-regulation.

Selwyn (2008a:19) states in his study on undergraduate use of the internet that ‘it would appear that any ‘barriers’ still underlying differences in students’ internet use run deeper than physical or technical issues of resourcing and skill’. He advocates discipline-specific studies, not necessarily on the resourcing of internet access and the development of internet skills, but ‘around developing students’ understanding of how technology fits into the material they are studying and the nature of learning in general’.

It is indeed in terms of the nature of learning that the third question in this research arises: What role does self-regulation play in third-year multimedia students’ use of the web to supplement and enhance formal course work and skills? Self-regulation, then, also forms the main theoretical framework in terms of which this research was conducted. The literature on self-regulation will be reviewed in terms of the following headings:

- Web as a self-regulated activity;
- A social cognitive view of self-regulation;
- Models of self-regulation;

- Characteristics of self-regulated learners;
- A cyclical view of self-regulation; and
- Self-regulatory processes or strategies.

The processes of self-regulation that will be discussed include:

- The role of motivation in self-regulated learning especially in terms of goal orientation, task value beliefs or control of learning beliefs, self-efficacy and affect;
- Metacognitive processes, including goal-setting and planning, self-monitoring, self-judgement and self-reaction; and
- Resource management processes including managing time and study environment, and peer-learning and help-seeking.

### **2.5.1 Web as a self-regulated activity**

As mentioned in Chapter 1, several studies show that web and internet use is essentially a self-regulative activity (Corno and Mandinach, 2004; Rogers and Swan 2001; Hartley and Bendixen, 2001; Hargis, 2000, Joo et al., 2000; Williams and Hellman, 2004; Lewis and Mandinach, 2009).

Bandura (2002:1) states that social cognitive theory provides ‘an agentic conceptual framework within which to study how electronic technologies impact worldwide connectivity and personal and national lives’. He suggests that, through technology, students can now exercise significant personal control over their own learning in comparison to the past where educational development was dependent on the quality of the schools that they attended. ‘Students now have the best libraries, museums, and multimedia instruction at their fingertips through the global internet for educating themselves independently of time and place. This shift in locus of initiative involves a major reorientation in students’ conception of education in which they are agents of learning, not just recipients of information’ (2002:4). Bandura, however, points out that information technologies will only be useful to students who choose to use them productively. Internet tutors will not be able to do much if students are not motivated to take advantage of what these systems have to offer. ‘Students must develop skills in regulating the motivational, emotional and

social determinants of their intellectual functioning, as well as the cognitive aspects.’ He further emphasises that self-regulatory skills alone are not enough if students do not apply those skills persistently, despite difficulties, stressors and distractions. Bandura cites a number of studies that indicate that perceived self-efficacy for self-regulated learning raises perceived self-efficacy to use the internet, which predicts success in managing internet-based self-instruction (2002:4).

Although referring to online courses, McMahon and Luca (2001:427-428) argue that self-regulatory skills are crucial for web-based learning, especially with increasing pressure on institutions to produce students with life-long learning skills that will prepare them for workplaces where they will consistently have to upgrade their skills through their own self-motivation and learning skills. They cite Brooks as saying that students ‘who are poor at self-regulation easily can be slaughtered in www-based courses’.

Hartley and Bendixen (2001:24) state that learning on the web requires self-regulatory skills and that learners’ ‘repertoire of strategies, like monitoring for understanding, and their willingness to invoke such strategies, will dramatically affect their ability to manage the wealth of information found on the web’.

Williams and Hellman (2004:73) argue that extending self-regulation research into the online learning domain makes sense because the learner has more choice in this environment. They base this view on Schunk and Zimmerman’s argument that a learning environment that includes learner choice encourages self-regulation.

### **2.5.2 Social cognitive view of self-regulated learning**

Over the last few decades the topic of self-regulated learning has been extensively researched in order to determine how students become ‘masters of their own learning’ (Zimmerman, 2008:166). Many of the researchers, such as Zimmerman and Schunk, base their models on Bandura’s social cognitive theory (Zimmerman, 1989:329). According to Bandura (1991:248), ‘human behaviour is extensively motivated and regulated by the ongoing exercise of self-influence’. Bandura (2001:1), from an agentic perspective, describes the ‘capacity to exercise control over the nature and quality of one’s life’ as the essence of humanness. In terms of this perspective a number of core features characterises human agency. According to

Bandura, these include ‘the temporal extension of agency through intentionality and forethought, self-regulation by self-reactive influence, and self-reflectiveness about one’s capabilities, quality of functioning, and the meaning and purpose of one’s life pursuits’. Personal agency does not operate in isolation but within a social network. ‘People are producers as well as products of social systems’ (2001:1).

### **2.5.3 Models of self-regulated learning**

A number of models of self-regulated learning have emerged, such as those of Zimmerman, Pintrich, Boekaerts, Borkowski and Winne (Puustinen and Pulkkinen, 2001:269). Of particular interest for this study are Zimmerman and Pintrich’s models. Zimmerman’s model is based on Bandura’s social cognitive theory and Pintrich’s work is also based on a social cognitive approach. Pintrich’s framework of self-regulated learning places a strong emphasis on motivational aspects of self-regulated learning (Puustinen & Pulkkinen, 2001:274). Zimmerman’s work has been both motivation and strategy-orientated (Puustinen and Pulkkinen, 2001:282-283). According to Puustinen and Pulkkinen, the two models are also similar in regard to their components and the research on which they were based.

According to Pintrich (2004:387), most models of self-regulated learning share four general assumptions:

- Based on a general cognitive perspective learners are assumed to form their own meanings, goals and strategies from the information available in their external environment and ‘in their own minds (the ‘internal’ environment)’.
- It is assumed that learners have the potential to monitor, control and regulate aspects of their own cognition, motivation and behaviour, and some environmental features. ‘This assumption does not mean that individuals will or can monitor and control their cognition, motivation or behaviour at all times or in all contexts, rather just that some monitoring, control and regulation is possible.’ According to Pintrich, a self-regulatory perspective recognises that biological, developmental, contextual and individual differences can interfere with the individual’s efforts to self-regulate.
- Models of self-regulation also assume that learners have some kind of goal, criterion or standard against which they compare themselves in order to determine

whether the learning process should continue as is, or whether some kind of change is needed.

- Another assumption is that ‘self-regulatory activities are mediators between personal and contextual characteristics and actual achievement or performance’. Therefore, it is not just the learner’s cultural, demographic or personality characteristics, or the contextual characteristics of the classroom environment that directly affect achievement and learning. It is the learner’s ‘self-regulation of their cognition, motivation and behaviour that mediate the relations between the person, context and eventual achievement’ (2004:387-388).

#### **2.5.4 Characteristics of self-regulated learners**

Zimmerman (1990:4) states that self-regulated learners do not only approach their learning with confidence, hard work and resourcefulness. Most importantly, they are also aware of whether they have a skill and know something, or not. They proactively look for information when they need it and they take steps to master their work. Self-regulators find a way to succeed when they come across stumbling-blocks such as teachers who confuse them, poor study conditions or difficult text. ‘Self-regulated learners view acquisition as a systematic and controllable process, and they accept greater responsibility for their achievement outcomes.’ Zimmerman defines self-regulated learners as ‘metacognitively, motivationally and behaviourally active participants in their own learning’ (1990:4).

#### **2.5.5 A cyclical view of self-regulated learning**

Researchers such as Zimmerman, Pintrich, Boekaerts, Borkowski and Winne have developed their work on self-regulation into models consisting of phases through which learning moves (Pintrich, 2004; Puustinen & Pulkkinen, 2001; Zimmerman, 2008). Although research for the present study was based on interviews investigating some aspects of self-regulation in more depth than others, it is still useful to look at this cyclical approach to gain a better understanding of the self-regulated learning process as a whole. Some of the models, such as Pintrich’s, contain four phases and others, such as Zimmerman’s, three phases, but the underlying principles are the same. Pintrich (2004:389) describes the four phases as follows:

- The first phase involves goal-setting and planning and the activation of the student's perceptions and knowledge of the task and context, and perceptions of the self in relation to the task.
- The second phase involves monitoring processes that 'represent metacognitive awareness of different aspects of the self and task or context'.
- During the third phase the student tries to control and regulate different aspects of the self, the task and context.
- Phase four involves reactions and reflections on the self, the task or the context.

Wolters (2010:6) points out that Pintrich and other researchers, including Zimmerman, do not view these different sub-processes as 'a strict time-order sequence or as casually connected in a linear fashion. Self-regulated learners engage in these different types of sub-processes in a flexible and adaptive fashion so that they can manage different aspects of their learning. Hence, the phases simply provide a structure and emphasise that self-regulated learning is dependent on students' active engagement before, during and after the completion of academic work (2010:6).

This means that goals and plans can be adjusted based on self-feedback from the monitoring, control and reaction processes (Pintrich, 2004:389). To illustrate this cyclical view of self-regulation, Zimmerman points out that when the student reflects on a task and experiences self-satisfaction, self-efficacy levels increase and positively affect the forethought process of a new task (2002:68).

## **2.5.6 Self-regulation**

### **2.5.6.1 The role of motivation**

Crucial to theories of self-regulated learning is the idea that learning and motivation are interdependent processes that cannot be separated (Zimmerman, 1990:6). Pintrich (1999:462) points to three general kinds of motivational beliefs: (a) self-efficacy beliefs or judgement of one's abilities to perform an academic task; (b) task value beliefs or beliefs about the importance, interest in and value of the task; and (c) goal orientations. The latter refers to why the student engages in the task. These could be to master a task, get high marks or social appraisal, or to measure ability in

comparison to other students. In the motivated strategies for learning questionnaire, Pintrich et al. (1991:12) also add an expectancy component (control of learning beliefs) to their motivational scales i.e. 'students' beliefs that their efforts to learn will result in positive outcomes'. Zimmerman also refers to four basic components in motivational beliefs, which basically contain the same elements: Self-efficacy, outcome expectations, intrinsic interest and learning goal orientation.

Pintrich (1999:466) describes three general goal orientations: A mastery goal orientation or intrinsic goal orientation; an extrinsic goal orientation; and a relative ability orientation. When a student has a mastery goal orientation, the student has a concern with learning and mastering tasks focusing on self-set standards and self-improvement. When students have an extrinsic goal orientation, their focus is on obtaining good marks and social appraisal such as from parents, teachers or other students. This is their main criterion for judging their success in their studies. A relative ability orientation refers to a students' concern with their ability in comparison to other students, i.e. doing better than classmates.

According to Pintrich et al. (1991:9-10), having an intrinsic goal orientation to a task or course 'indicates that the student's participation in the task is an end all to itself, rather than participation being a means to an end', such as obtaining a qualification. An extrinsic goal orientation can complement intrinsic goal orientation.

Pintrich (1999:465) cites Eccles in saying that there are three components to task value beliefs, namely, the individual's perception of the importance of the tasks, their personal interest in the task and their perception of the usefulness of the task.

For example, students will be motivated to perform well in a particular aspect of their course if they believe it will increase their job opportunities.

Another important aspect of motivation is students' expectations of the outcome that their learning will have. Unless the outcomes or results of their efforts to learn are sufficiently positive, students will not have the motivation to learn (Zimmerman, 1990:6). Pintrich et al. (1991:12) argue that control of learning beliefs or outcome expectations also refers to students' belief that their learning outcomes are dependent on their own effort in contrast to, for instance, lecturers' teaching methods or other external factors.



According to Bandura, nothing is more ‘central or pervasive’ to personal agency than people’s self-efficacy beliefs, or the belief that they have the ability to control their own level of functioning and other events that may affect them. ‘People’s beliefs in their efficacy influence the choices they make, their aspirations, how much effort they mobilise in a given endeavour, how long they persevere in the face of difficulties and setbacks, whether their thought patterns are self-hindering or self-aiding, [and] the amount of stress they experience in coping with taxing environmental demands...’ (1991:257-258). Bandura states that self-beliefs of efficacy determine in part how the various elements of self-regulation operate. These beliefs could for example influence people’s perceptions of what caused them to succeed or fail. People with high self-efficacy attribute their failures to insufficient effort. In contrast, people with low self-efficacy contribute their failure to low ability.

Self-efficacy does not only refer to a student’s belief in his or her ability to handle a task but could also refer to a student’s beliefs about their ability to self-regulate (such as being able to finish a task in time) or the belief in the ability to focus, or social self-efficacy, such as the ability to make meaningful contributions in class (Usher & Pajares, 2007:446).

According to Pintrich et al. (1991), anxiety about tests is negatively related to academic performance and expectancies regarding the outcome of learning. They distinguish between two components: a worry or cognitive component, and an emotional component. The worry component refers to students’ negative thoughts that disrupt performance, while the emotional component refers to affective and physiological arousal aspects of anxiety.

#### 2.5.6.2 Metacognitive processes

Bandura and Schunk (1981:586) regard goal-setting and self-reaction to one’s own behaviour as important sources of self-motivation. They argue that this form of self-motivation operates through ‘internal comparison processes’ which require ‘personal standards against which to evaluate ongoing performance’. However, they point out that personal goals and standards do not automatically set in action processes of self-evaluation that determine the level and course of a person’s behaviour. ‘Certain

properties of goals, such as their specificity and level, help to provide clear standards of adequacy'. Goals, therefore, must be explicit and not vague intentions. The proximity or closeness of the goal is crucial, and the influence of goals on behaviour is determined by how far in the future they are.

Also important to this study is the self-reflection phase mentioned above. Self-reflection includes self-judgement and self-reaction and occurs after tasks have been completed, and relates directly to the student's performance (Labuhn et al., 2010:174). An important type of self-judgement is self-evaluation during which the student compares his or her learning outcome with a goal or standard. In response to this comparison, the student experiences affects such as satisfaction or dissatisfaction, which in turn has an effect on the next learning task, i.e. the student has more motivation for the next task or adjusts strategies to ensure success in the next task.

According to Labuhn et al. (2010:176), most studies of performance calibration show that the 'vast majority of students' lack the skill to estimate their performance accurately. Many students overestimate their ability to perform a particular task and this overestimation is often related to lower performance. They point out that students who overestimate their performance are unlikely to make the necessary effort to execute a task.

#### 2.5.6.3 Resource management processes

Resource management strategies or processes include the management of the student's time and study environment. These strategies also include how much effort students put into a task and whether they engage in peer-learning or seek help from peers or lecturers (Pintrich et al., 1991:25-29). According to Pintrich et al., self-regulated learners schedule, plan and manage their time but also use their study time effectively and set realistic goals. They also seek out environments that are conducive to learning with minimal distractions.

Wolters (2010:10) points out that, although much of the research on self-regulated learning has focused on the abilities of individual students, there is an increasing interest in the social and interpersonal aspects of self-regulated learning. Research studies have also shown that many skills and beliefs that form the basis of self-

regulated learning are acquired through social processes. He states that some researchers have emphasised that self-regulation could also be viewed as ‘co-regulation’ in that students and teachers, parents and peers support each other ‘interactively in a sociocultural, goal-directed system’ (2010:10). According to Pintrich et al. (1991:29), ‘good students know when they don’t know something and are able to identify someone to provide them with some assistance’. As will be discussed in the findings of this study, peer-learning should not be what I would term ‘peer-doing’.

## ***2.6 Summary of Chapter 2***

This chapter summarised the literature informing this study. I firstly sketched an overview of the existing research on web use by students. The bulk of this literature refers to student web use in general and for formally assessed academic purposes, rather than on the topic of this study, i.e. the use of the web to supplement and enhance formal course work and skills. It was found that a paucity exists in regard to research of this nature. I then looked at the factors that could affect the high use of the web to supplement and enhance formal course work and skills, such as location of access, demographic factors and direct assessment attached to web use by students. Lastly, I introduced the main theoretical framework of this research, i.e. the role of self-regulation in third-year multimedia students’ use of the web to supplement and enhance formal course work and skills.

## Study Design

### ***3.1 Research orientation***

The research for this study falls predominantly within the interpretive paradigm. According to Merriam (2002:4), interpretive designs try to understand the meaning people construct about their world and their experience, i.e. ‘how do people make sense of their experience?’ Although interpretivism is a paradigm traditionally associated with qualitative research, Merriam (2002:4), Maxwell (2008:221) and Howe (2004:54) call for ‘mixed-method interpretivism’ where ‘quantitative methods play an auxiliary role in an overarching interpretivist-qualitative framework. According to Howe, mixed methods interpretivism ‘actively engages stakeholder participation through the principles of inclusion and dialogue. Inclusion is a general methodological principle that serves to control bias by ensuring the representativeness of samples’ and ‘ensuring that all relevant voices are heard’ (2004:54). Howe points out that interpretivism places an emphasis on ‘understanding people in their own social settings’. He states that engaging them in dialogue is the most effective means of achieving this aim, and that through dialogue ‘deeper and more genuine expressions of beliefs and values’ emerge (2004:54). In this research, I wanted to ensure that I looked at all possible factors that could be relevant to third-year multimedia students’ use of the web for self-study. I therefore selected participants across a wide spectrum to get an in-depth view of the reasons for high and low use of the web among students in a particular environment with specific settings.

### ***3.2 Type of research***

A mixed-method approach was followed in this study in that a questionnaire with both qualitative and quantitative items and in-depth interviews were used (*Appendix 1 and 2* respectively). Cresswell and Garrett (2008:322) describe mixed methods as ‘an approach to inquiry in which the researcher links, in some way, both quantitative and qualitative data to provide a unified understanding of a research problem’. The first phase of this

research consisted of the questionnaire that included questions about the number of hours students spend using the web in different settings, as well as Likert-type and open-ended questions on aspects of their studies. The second phase consisted of interviews using the interview guide approach. This approach will be expanded on further in this chapter.

As pointed out by Harris and Brown (2010:1), mixed-method researchers deny that the ‘paradigmatic differences between ways of viewing the world, make qualitative and quantitative methods incompatible’. In a discussion on the ‘paradigm wars’ of the 70’s and 80’s among sociology researchers, Denzin (2010:419-427) calls for a community that celebrates paradigm and methodological diversity’ and states that ‘the recognition that all methods are hybrids, emergent, interactive productions, productively extends the mixed-methods-paradigm discourse’. Citing the views of Howe, Teddlie and Tashakkori, and Cresswell and Clark, Denzin refers to the combination of qualitative and quantitative approaches in one study and states that ‘mixed, multiple, and emergent methods are everywhere today, in handbooks, readers, texts’ (2010:420).

A study by Bryman (2006:97) on the integration of quantitative and qualitative research shows that 57.3% of the 232 social science articles studied by him used a combination of a survey instrument and qualitative interviews.

Bryman (2006:105) mentions Greene, Caracelli and Graham’s scheme for justification of combining quantitative and qualitative research methods. This scheme condenses the reasons for combining research to five possibilities, i.e. triangulation, complementarity, development, initiation and expansion. However, Bryman found at least 16 reasons why the researchers in his study combined the two methods. I will use Green et al.’s scheme to illustrate my reasons for combining the two methods because I found that many of Bryman’s 16 reasons overlap with those of Green et al. Bryman cites Greene et al.’s five reasons for combining quantitative and qualitative research as:

‘Triangulation: convergence, corroboration, correspondence or results from different methods’;

- Complementarity: to seek ‘elaboration, enhancement, illustration, and clarification of the results from one method with the results from another’;

- Development: ‘seeks to use the results from one method to help develop or inform the other method, where development is broadly construed to include sampling and implementation, as well as measurement decisions’;
- Initiation: ‘seeks the discovery of paradox and contradiction, new perspectives of [sic] frameworks, the recasting of questions or results from one method with questions or results from the other method’; and
- Expansion: ‘seeks to extend the breadth and range of enquiry using different methods for different inquiry components’ (2006:105).

My reason for using both quantitative and qualitative measures includes triangulation, complementarity, development and expansion as explained by Greene et al. In terms of triangulation it was necessary to question students in person on a number of issues appearing in the questionnaire. For example, students had to indicate in the questionnaires how much time they spend using the web at different venues and how frequently they used the web for different activities. In the interviews they were further questioned about these items. The vast majority of students for instance also said that they had goals for their studies, but in the interviews it became clear that students had only vague or distal goals such as ‘passing the course’. In terms of complementarity, students were asked in the questionnaire about their access to computers during their school years. It was deemed necessary in the interview to determine the location where students had access to computers during their school years. In terms of development, part of the original plan with the questionnaire was to identify students for in-depth interviews. Therefore, issues raised in the questionnaire, such as where students access the web most, were further investigated in the interviews. Expansion in this study refers to the fact that it was necessary to use a different method – in-depth interviews – to obtain in-depth information about students’ self-regulatory behaviour because the questionnaire was not suitable for this purpose.

### ***3.3 Research approach***

According to Maxwell (2008:235) whenever one has to make a choice about whom to talk to or which information sources to focus on, one is faced with a sampling decision.

According to Teddlie and Yu (2007:78) there are four broad categories of sampling techniques. They are:

- Probability sampling;
- Purposive sampling;
- Convenience sampling; and
- Mixed-methods sampling.

The sampling method used in this study can be described as purposive sampling, which Maxwell (2008:235) refers to as purposeful sampling. According to Teddlie and Yu (2007:77), purposive sampling is mainly used for qualitative studies and can be defined as 'selecting units (e.g. individuals, groups of individuals, institutions) based on specific purposes associated with answering a research study's questions'. According to Maxwell (2008:235) there are four important reasons for using purposeful sampling. These include:

- To achieve 'representativeness or typicality of settings, individuals or activities selected';
- To 'capture adequately the heterogeneity in the population';
- To 'allow for the examination of cases that are critical for the theories that they began with or that have subsequently been developed'; and
- To establish particular comparisons to illuminate the reasons for differences between settings or individuals.

I chose sampling as method for this study to interview participants who are representative of categories of students such as those who had access to computers and the web for many years and those who did not. The sampling method also allowed me to make comparisons between the web use patterns of the individual multimedia students and factors that may be relevant to third-year multimedia students' use of the web to supplement and enhance formal course work and skills.

According to Sandelowski (2000:252), the results of instruments – in this study the questionnaire – can help researchers to select more precisely those kinds of participants they want to study and the kinds of information they want to get from them.

### **3.4 Research questions**

- (1) To what extent do third-year multimedia students use the web to supplement and enhance their formal course work and skills?
- (2) Which of the following factors are relevant to third-year multimedia technology students' use of the web to supplement and enhance formal course work and skills?
  - Location and type of web access;
  - Demographic factors such as age, schooling, years of experience, educational background of parents, gender, and family support for technology; and
  - Other factors which might influence web use, such as: encouragement from lecturers to use the web; general use patterns which could affect the use of the web to supplement and enhance formal course work and skills – for example the use of social networking and e-mail, direct assessment such as assignments attached to web use; and multimedia students' attitude towards the web and perceived ease of use.
- (3) What role does self-regulation play in third-year multimedia students' use of the web to supplement and enhance formal course work and skills, especially in terms of:
  - The role of motivation in self-regulated learning, including goal orientation, task value beliefs, outcome expectations or control of learning beliefs, self-efficacy and affect;
  - Metacognitive processes, such as goal-setting and planning, self-monitoring, self-judgement and self-reaction; and
  - Resource management strategies, including time and study environment management, peer-learning, and help-seeking.

### **3.5 Research tools**

#### **3.5.1 Questionnaire**

In the first phase, the third-year multimedia class was asked to complete a questionnaire (*Appendix 1*) that included quantitative and qualitative questions.



Nineteen of the 23 students in the class completed the questionnaire. According to Harris and Brown (2010:1), questionnaires can provide ‘evidence of patterns amongst large populations’, while qualitative interview data ‘often gather more in-depth insights on participant attitudes, thoughts and actions’. In this study, a questionnaire was used to get a general overview of the whole group’s access and use patterns, their view of their course and their approach to their studies. It was also decided to use the questionnaires for sampling purposes to select students for interviews.

The whole third-year multimedia class was asked to complete a questionnaire covering the following areas:

- Students’ access to computers and the web;
- Their general use of the web;
- How they view the multimedia course in terms of their decision to take the particular course, the difficulty of subjects and enjoyment of the course;
- How they approach their studies;
- Their approach to problem-solving; and
- Demographic information.

The questionnaire proved very useful in selecting participants based on issues such as access to and use of computers and the web and demographic information such as age, parents’ education and students’ schooling. It also provided information on the web use patterns of the students as a group, as is set out in *Chapter 4*.

The sections in the questionnaire on how students approach their studies, solve problems and view their course were not deemed useful. With hindsight it was thought that the questions were drafted in such a manner that students were able to see clearly what the most desirable answers would be instead of giving honest answers. The in-depth interviews confirmed this suspicion, and there were countless discrepancies between how the students interviewed answered the questionnaire and how they answered questions in the interview in terms of self-regulation. Students, for instance, would state in the questionnaire that they set goals for their studies but in the interviews it emerged that several students do not

really have goals for their studies. It was therefore decided to only use information from the survey related to students' web use and demographic information.

### 3.5.2 Interviews

According to Johnson and Christensen (2004:n.p.), there are three types of qualitative interviews:

- The informal conversational interview which is spontaneous and loosely structured;
- The interview guide approach, which is more structured than the informational conversational interview; and
- The standardised open-ended interview for which 'open-ended questions are written on an interview protocol and asked in the same order and with the same wording.

The interview type selected for this study was the interview guide approach. According to Johnson and Christensen (2004:n.p.), this approach includes an interview protocol that lists the open-ended questions, and the questions can be asked in any order. If regarded as necessary, the wording of the questions can be changed (*Chapter 6*).

I chose this type of interview strategy because I wanted the interviews to be as spontaneous as possible but still wanted to be sure that I gather the same information from all the participants. Questions were drafted in advance but due to the informal and spontaneous nature of the interview all questions to the different students were not phrased exactly the same (*Appendix 2*). However, all students were questioned on the same elements of self-regulated learning with the pre-drafted questions serving as guideline. In some instances the student introduced a particular topic through his or her answer to a previous question. In other instances students had to be prompted when it seemed as if they did not understand the question. The next section will discuss the basic subtopics discussed with each student during the interviews. In terms of access to and use of the web, the following matters were covered:

- Type of access to computers and the web during primary and secondary school, if any;
- Years of access to a computer;
- Location of access to the web;
- Cell phone access and use;
- Web access via cell phone;
- Number of hours spent on the web in the lab;
- Number of hours spent on the web off campus;
- Division of time spent on web and internet access between academic and other uses, especially web use for self-study; and
- Web credit use on student accounts.

As mentioned in *Chapter 1*, the assumption was that elements of self-regulation such as student's motivation for the course have an impact on use of the web to supplement and enhance formal course work and skills, and this assumption was tested during the research. Largely, the interview questions were based on the topics covered in Pintrich et al.'s Motivated Strategies for Learning Questionnaire (1991), but the MSLQ merely served as a guideline.

The self-regulation topics covered during the interviews were:

- Intrinsic and or extrinsic goal orientation;
- Task value beliefs;
- Outcome expectations;
- Self-efficacy;
- Affective component – anxiety;
- Rehearsal;
- Elaboration;
- Organisation;
- Critical thinking;

- Metacognitive self-regulation, including goal-setting, planning, self-monitoring, self-judgement and self-reflection; and
- Resource management strategies such as managing time and study environment, and peer-learning and help-seeking.

### **3.6 Data analysis**

According to Maxwell (2008:236) there are three main groups of strategies for qualitative data analysis, which formed the main approach for this dissertation, i.e.

- Categorising strategies (e.g. coding and thematic analysis);
- Connecting strategies (e.g. narrative analysis and individual case studies); and
- Memos and displays.

Maxwell points out that the above methods can and should be combined. According to him, the main categorising strategy is coding, of which the goal in qualitative research is ‘not to produce counts of things but to fracture the data and rearrange it into categories that facilitate comparison between things in the same category and between categories’ (2008:237). Maxwell further distinguishes between organisational, substantive and theoretical categories. Organisational categories are described as ‘broad subjects or issues that are determined prior to interviews’ (2008:237), such as the categories for the factors relevant to third-year multimedia technology students’ use of the web to supplement and enhance formal course work and skills. Substantive categories are descriptive and ‘stay close to the data categorised’, while theoretical categories ‘place the coded data into a more general or abstract framework ... which ‘may be derived either from prior theory or from an inductively developed theory’ (2008:238). The application of different elements of social cognitive theory of self-regulation in analysing the interviews for this study is a case in point.

Maxwell (2008:238-239) considers connecting strategies as part of the attempts to understand the data in context and to identify the relationships among the different elements. For example, in this research I tried to understand whether there is a connection between the high use of the web by the students in the study and several factors that could explain the high use of the web. Maxwell points out that both categorising and connecting

strategies are valid and useful tools in qualitative analysis, and that a study relying on only one or the other runs the risk of missing important insights.

The interviews and questionnaires were analysed in terms of the factors considered relevant to third-year multimedia students' use of the web to supplement and enhance formal course work and skills. I also used a combination of Pintrich and Zimmerman's models to analyse each interviewed student's self-regulation. These categories are set out in the preceding page. It should be emphasised that not all categories analysed after the interviews were deemed significant and were therefore not reflected in the findings. The categories excluded in the findings, but reflected in the analyses in **Appendix 3**, include strategies such as rehearsal, elaboration and organisation. They were not removed from the initial analyses. Each interview was transcribed and then analysed. **Appendix 3** contains the analyses of the ten interviews in terms of the categories mentioned, while quotations and examples from the interviews and analyses are demonstrated in the findings in **Chapter 4**. Due to space constraints it was not possible to include the ten analysed documents in the main body. In the consent form (**Appendix 6**), students were given the assurance that I would be the only person listening to the recordings – this to ensure greater openness from students in the interviews. The audio recordings and interview transcripts, thus, remain confidential. The more than 200 pages of transcripts, however, could be made available to the examiners on request, following deletion of names and references to lecturers.

### ***3.7 Participants in the study***

There were 23 students in the class, all from previously disadvantaged groups. Eleven of the students were coloured and twelve black in terms of South Africa's former apartheid race classification system. In this particular class the level of gender representativity was uncharacteristically low compared with the previous five years of my experience with multimedia students, as only three students were female. The socio-economic status of the students appears to be mixed, but mainly lower- and middle-income – a rough estimate based on the occupations of the main breadwinners, the home addresses of students and the schools they attended. It was decided not to ask students about the income levels of the main breadwinner in the house, so as not to compromise their level of comfort in respect

of the completion of the survey. It was also thought that students would not necessarily know how much their parents earn. Nineteen students out of the 23 completed the questionnaires.

Of the 19 students who completed the questionnaire, 17 had access to a laptop or PC at home or in their campus residence rooms. Only three of them, however, had access to the web at home. One student who lived in a campus residence had a wireless connection in his room. Seven of the 23 students in the class lived in campus residences but the rest lived off campus. All students had access to computers and the web in the IT centre, which is open 22 hours per day. The multimedia technology students also have their own labs, which are officially open until 16:00. However, students may also arrange for a key after hours.

### **3.7.1 Selection of participants for interviews**

Unfortunately, the students who volunteered for interviews were not all suitable candidates for the interviews in terms of a representative sample. Although the intention of this research is not to generalise the results to all third-year multimedia students, certain criteria were used to get a representative group of final interview candidates, mainly in terms of their access to and use of the web. The criteria were:

- Access or lack of access to computers and the web before students started the multimedia course;
- Overall number of years of access to, and use of, computers and the web respectively;
- Location of access to the web;
- Hours spent on the web per week;
- Students' level of participation in class discussions;
- Second-year marks;
- Gender;
- Race; and
- Schooling.

Six of the 11 students who were eventually interviewed volunteered for these interviews in the questionnaires they had completed in class. Based on the main criteria mentioned above, another five students who did not volunteer were also asked whether they would be willing to partake. The five students who did not volunteer for interviews initially all agreed without reservation to partake in the interviews. All students who were interviewed signed a consent form and it was agreed that their identity would remain confidential (*Appendix 6*).

It was decided to leave one of the interviewees out of the study because there were obvious discrepancies in his questionnaire and in the interview. The student, for instance, insisted in the interview that he spends 48 hours on the web from Monday to Friday as indicated in his questionnaire. This would mean more than 9 hours per day on top of attending class, working as a part-time lab assistant and having a fairly busy social life. *Table 3.1* provides a summary of the basic data relevant to the ten interviewed students who were included in this study.

**Table 3.1**

**Summary of basic data**

	Age	School	Breadwinner's highest qualification	Computer use (number of years)	Web use (number of years)	WAP-enabled cell phone (yes/no)	Web access outside lab	Hours per week spent on the web in the lab	Off-campus hours per week
John	20	Former HoR school*	Degree	5-6	3-4	Yes	Cell/Friend	14	2-4
Cyril	20	Former HoR school	Matric	10+	3-4	Yes	Cell/Family	15-20	1-2
Mpumi	20	'Elite' township school **	Matric	5-6	5-6	No	Internet café	1-2	½- 1
Sipho	23	Former DET school***	Don't know	9-10	4-5	Yes	Cell/Wireless	15-20	9-10
David	22	Former Model C school****	ND	6-7	4-5	Yes	ADSL home	9-10	7-8
Thabo	23	Former DET school	Matric	2-3	2-3	No	-	20-25	-
Clyde	22	Former Model C school	Matric	10+	6-7	Yes	Cell/Internet café/work/friend	3-4	2-3
Thandi	20	Former HoR school	Degree	7-8	7-8	Yes	Cell/Internet café	7-8	1-2
Vusi	23	Former Model C school	Postgrad	10+	10+	Yes	Cell/Internet café	25	1-2
George	20	Former HoR school	Matric	9-10	4-5	Yes	Cell/Internet café	5-6	1-2

\* Former House of Representatives or traditionally coloured school.

\*\* Mpumi described her school as an 'elite' school – a STEM or Science, Technology, Engineering and Mathematics school which prepares students for university.

\*\*\* Former Department of Education and Training (DET) or traditionally black school.

\*\*\*\* Former Model C or traditionally white school.



### **3.8 Research process**

#### **3.8.1 How the survey questionnaire was administered**

Permission was obtained from the multimedia programme's domain leader to use one of the class periods to explain the purpose of the research to the students and to ask for their voluntary participation (*Appendix 4*). Each student in the class was also given an information sheet explaining the purpose of the research and the research method, as well as the ethical requirements for a study of this nature, especially in terms of confidentiality and the voluntary nature of the study (*Appendix 5*). Students were given the choice not to complete the survey, but all 19 students present agreed to complete the survey. Students were given the choice to either complete the survey anonymously or provide their names. They were given a further option to volunteer for interviews. It was explained to students that their real names would not be used at all. They were told that, depending on the results of the survey, students who did not volunteer for interviews might also be asked to participate in the interview process but that they were welcome to refuse if they were not interested.

#### **3.8.2 How the interviews were conducted**

The interviews took place on 2, 3 and 4 June 2010, which were the last three days of the second term, at a time when the third-year multimedia students had already completed their classes and assessments for the term. Because the students were already on holiday and at home, it was decided to pay for their transport costs to and from campus and to give each participant a cell phone airtime voucher in return for sacrificing their holiday time.

Three students were interviewed on the first day and four on each of the remaining days. The eleven students who agreed to be interviewed were also e-mailed in advance and asked whether they would mind if the interviews were recorded. An information and permission sheet for the interviews was also attached so that students could study this in advance and decide whether they would want to participate (*Appendix 6*).

All students agreed to be recorded and a Blackberry Curve 2580 was used for the recording. Students were given the assurance that I would be the only person listening to the recordings. The interviews took place in my office. The office setup was changed so that students could sit behind a desk and not feel physically exposed when being interviewed. Each interview was scheduled to last one hour but ranged from 50 to 90 minutes. The longer interviews were due to the fact that the interviewees gave long answers in response to questions, and it was felt that they should not be interrupted to ensure the spontaneity of the interview.

Although my plan was to take notes during the interviews, the interviews proceeded in such a spontaneous and relaxed fashion that note taking proved impossible from the first interview. I personally transcribed all the interviews.

### **3.8.3 Validity concerns**

At the start of the interview it was explained to students that my intention with this research is to 'take a snapshot' of how a group of anonymous multimedia students use the web in relation to their studies. It was explained to them that there are no right or wrong answers in this kind of research and that the kind of answers they give will have no impact on their placement.

Although I had a slight concern in this regard, it has been my experience over the last six years that students in all disciplines I have worked with do not hesitate to discuss their personal problems with me, despite the fact that I am also the person who has to place them in industry.

I feel that my experience in counselling students on many topics of a highly confidential nature and my informal style of interaction with students resulted in very open and honest interviews for this research.

Only one of the students asked questions before the start of the interview. His main concern was whether he should try to remember how he answered the questionnaire. All students were urged to answer questions openly, honestly and spontaneously. The interviews started off with questions about students' access to and use of computers and the web during their school years and this straightforward topic proved key in relaxing the students.

### **3.9 *Limitations of the study***

One of the problems encountered in this study was what Johnson and Christensen (2004:n.p.) refer to as possible reactive effects. Some sections in the questionnaire were designed to acquire an idea of students' self-regulatory behaviour but the respondents seemed to anticipate what the most desirable answers were. However, Patton (1999:1194) points out that one ought to expect initial conflicts between the findings of qualitative and of quantitative data. Zimmerman (1990:8) points out that an open-ended interview format instead of a questionnaire format could be beneficial when investigating self-regulation because self-constructed answers more closely simulate 'naturalistic conditions of students' self-regulated learning than multiple-choice answers'.

In the interviews, students did not always give the same answers as they did in the questionnaire. Although, as pointed out by Johnson and Christensen (2004), reactive effects can also occur in interviews, answers can be clarified therein, something not possible in the questionnaires.

Ten students were interviewed (originally eleven) – which means that the findings cannot be generalised to the multimedia class as a whole or to all multimedia students. The level of self-regulation of each individual student could not be determined in detail because of the research method used, i.e. interviews. As pointed out by Zimmerman and others, multiple measures should be used to come to more exact conclusions about each individual student's level of self-regulation.

### **3.10 *Summary of this chapter***

The research for this study falls within the interpretive paradigm and a mixed-method approach was used. The research approach can be characterised as purposive sampling. The research tools were a questionnaire and in-depth interviews, and data were analysed using categorising and connecting strategies. All students present in class (19 out of 23) completed the questionnaire; eleven students were then selected for in-depth interviews, and of these one was dropped. Although there were initially some validity concerns, interviews progressed smoothly. The limitations of the study were, among others, that

students could anticipate which answers regarding self-regulation were most desirable in the questionnaires, but answers could be verified and clarified in the interviews. Due to the small number of interviewees, the findings cannot be generalised to all multimedia students.

## Findings

### ***4.1 Introduction***

I will present the findings of the research in this chapter. Due to space constraints, the full analysis of each student's interview is not included in this chapter, but is added as *Appendix 3*. I will first look at the findings in terms of the extent to which third-year multimedia students use the web to supplement and enhance their formal course work and skills. Secondly, I will look at factors relevant to third-year multimedia students' use of the web to supplement and enhance formal course work and skills. Thirdly, I will look at the role that self-regulation plays in third-year multimedia students' use of the web to supplement and enhance formal course work and skills. These findings are based on data from the questionnaires and an analysis of all the interview transcripts.

### ***4.2 Extent to which third-year multimedia students use the web***

Regarding the extent to which third-year multimedia students in the study use the web to supplement and enhance formal course work and skills, it was found that two of the ten students interviewed used the web extensively for self-study, a further three were relatively high users for this purpose, while five of the ten students were low users of the web for self-study. The two high users of the web, John and Cyril, are also two of the three top achievers in the class. As shown in *Table 4.2*, John and Cyril reported that 65% and 55% respectively of their web use is to supplement and enhance formal course work and skills, not involving assignments or directly assessed work. David reported that 30% of his web use is for work not involving assignments, Sipho 20%, Vusi 10%, George 5-10% and Thandi 5%. Mpumi, Clyde and Thabo had difficulty giving an estimate of their web use to supplement and enhance formal course work. These students were not pressurised if after several attempts they still failed to give an estimate. However, Thabo felt that 45–50% of his web use is for his studies 'mostly not for assignments'. In terms of their second-year marks, David, Thabo and Sipho fell within the top 30% in the class. The other five

students were average to weak students. The significance of the ten students' academic achievement will be discussed in *Chapter 5*.

For the rest of this chapter and *Chapter 5*, John and Cyril will be referred to as high users (HU) of the web to supplement and enhance formal course work and skills and Sipho, Thabo and David as relatively high users (RHU) of the web for self-study. Thandi, Vusi, Mpumi, Clyde and George will be referred to as low users (LU) of the web to supplement and enhance formal course work and skills (see *Table 4.1*).

As seen in the literature review, good access does not guarantee high use of ICTs and this seems to be the case with at least four of the ten students in the study. They indicated that they do not spend much time on the web, and thus spent minimal time on web use for self-study. This was despite the fact that the multimedia students get four times more web credits than other undergraduate students. Mpumi (LU) stated that she uses the web to supplement and enhance formal course work and skills 'maybe once a week'. However, her time spent on the web is minimal and it is doubtful that she engages in much web use for self-study, seeing that she reported in her questionnaire that she accesses the web every day or almost every day for purposes unrelated to her studies. Clyde (LU) stated in the interview that he does not use the web for self-study 'very often'. In his questionnaire, he indicated that he would look for inspiration for the course, information to help him with class work, and information to teach himself new multimedia skills, twice a month.

**Table 4.1**

***High, relatively high and low web users***

High web users (HU)	Relatively high web users (RHU)	Low web users (LU)
Cyril	Sipho	Thandi
John	Thabo	Clyde
	David	Mpumi
		George
		Vusi

Linked to the proportion of time that students use the web for formal course requirements, as well as for self-study to supplement and enhance formal course work and skills, are the

total number of hours that the students report spending on the web (*Table 4.2*). The table is based on information drawn from the questionnaires and the interviews. The first column shows the number of hours that students spend on the web while in the lab. The second column shows students' estimate of how many hours per week they spend on the web outside of the lab, for example, at an internet café or a friend's house. Column three reflects the total number of hours that students spend on the web per week. The second last column reflects the number of hours students spend on the web for self-study, as a proportion of the total hours spent on the web per week. Students' estimate of the proportion of time spent on the web for self-study is reflected in the last column.

Information on the proportion of time spent on the web for self-study was obtained during the interviews. Students were asked to indicate which proportion of their time spent on the web is for self-study, i.e. for studying not related to assignments or tests. John (HU), Cyril (HU) and David (RHU) respectively spend 15-16, 16-22 and 16-18 hours per week on the web. Sipho (RHU) and Thabo (RHU) spend substantially more hours on the web than John, Cyril and David, and therefore the number of hours they spend on self-study also increases. The proportion of hours spent on the web for self-study was calculated on the maximum number of hours that students reported using the web.

Since Mpumi (LU), Clyde (LU), George (LU) and Thandi (LU) spend substantially less time on the web than any of the other students, their use of the web for self-study becomes minimal, if not negligible, compared to web time spent on assignments, social networking and other uses unrelated to their studies.

Vusi reports spending up to 27 hours per week on the web and estimates that 10% of his time is for self-study. Although he reported relatively low use of social networking and e-mail compared to the other low users in his interview, a closer inspection of his questionnaire reveals that he checks news, sports, Facebook, music, and the latest gadgets, either a few times a day, every day, or a few times a week. This casts doubt on his low estimate for time spent on information unrelated to his studies. From the table it can be seen that the relatively high user (David) with the least hours spent on web use for self-study still spends double the time on self-study, than the low user (Vusi), with the most hours spent per week on self-study. John and Cyril, who are two of the three top academic achievers in the class, report spending on average 10.5 and 12 hours respectively on using

the web for self-study, compared with the  $\pm 42$  minutes spent by Thandi and the 48 minutes spent by George.

**Table 4.2**

***Time spent on the web \****

	Hours in lab	Hours outside lab	Total	Number of hours for self-study as proportion of total hours per week**	Student estimate of proportion of time spent on web use for self-study
<b>John</b>	14	1-2	15-16	10.5 hours	65%
<b>Cyril</b>	15-20	1-2	16-22	12 hours	55%
<b>Mpumi</b>	1-2	0.5-1	1.5-3	'Maybe once a week'	Unable to give proportion
<b>Sipho</b>	15-20	9-10	24-30	6 hours	20%
<b>David</b>	9-10	7-8	16-18	5 hours 25 min	30%
<b>Thabo</b>	20-25	-	20-25	Difficult to estimate. See ***	Unable to give proportion
<b>Clyde</b>	3-4	2-3	5-7	Twice a month	Unable to give proportion
<b>Thandi</b>	7-8	1-2	8-10	$\pm 42$ min	5%
<b>Vusi</b>	25	1-2	26-27	$\pm 2$ hours 40 min	10%
<b>George</b>	5-6	1-2	6-8	$\pm 48$ min	5-10%.

\* Information obtained from questionnaire and interviews

\*\* Students' estimate of proportion of voluntary web use for self-study as proportion of overall web use. Proportion calculated on maximum hours spent per week.

\*\*\* Thabo felt that 45–50% (11–12.5 hours) of his web use is for studies, 'mostly not for assignments'.

### ***4.3 Factors relevant to web use***

This section will look at the factors relevant to third-year multimedia students' use of the web to supplement and enhance formal course work and skills. These factors include location and type of access to the web, and demographic factors such as age, schooling,



years of experience, parents' educational background, gender, and family support for technology. The section will also look at factors such as assessment, encouragement by lecturers and other uses found to be relevant to the high use of the web.

The two highest users of the web to supplement and enhance formal course work and skills, John and Cyril, both live off campus and do not have web access at home as can be seen in **Table 4.3**. However, this does not seem to impede their web use. When asked how often they look for information on their cell phones, both students stated that when they are in the lab, they download the information they need to work at home.

Cyril (HW): *I look for information (on my cell phone) when I am at home and I need more information to help me with my assignments and projects, which is not a lot of the time as I try to get all my information when I am using the web at campus.*

John (HW): *Well, most of the time at home, I don't normally have to go onto the internet. There's no need to do it because when I'm at the lab, I make sure I get everything I need so that I can apply it at home.*

Two low web users, Vusi and Clyde, spontaneously mentioned in the interviews that they would have worked more at home if they had web access there. Mpumi (LU), who also lives off campus, does not have access to a computer or the web at home and also felt she would have worked harder if she had a computer at home. However, of the four students, only Vusi spends a considerable amount of time on the web in the lab. Mpumi's total web use is minimal (a maximum of three hours), as can be seen from **Table 4.2**.

Cyril (HU) and John (HU), the high users who also live off campus, spend substantially more time on the web than Thandi (LU), who lives on campus and can access the web after hours. Vusi (LU), who lives off campus, spends as much time on the web as Thabo (RHU) who lives on campus. But Thabo estimates that he could spend up to 50% of his web time on self-study.

**Table 4.3*****Location of access***

Name	Web use for self-study	Main location of access
John	High user	Campus
Cyril	High user	Campus
David	Relatively high user	Home and Campus
Sipho	Relatively high user	Campus
Thabo	Relatively high user	Campus
Thandi	Low user	Campus
Mpumi	Low user	Campus
Vusi	Low user	Campus
Clyde	Low user	Campus
George	Low user	Campus

The only student who has web access at home, David (RHU), still uses the web more in the lab than at home : 9–10 hours in the lab compared to 7–8 hours at home. The same applies to Sipho who has a wireless connection that he uses in his room in the campus residence. He still spends 15–20 hours in the lab compared to 9–10 hours in his room, but he does mention that cost is an inhibiting factor in respect of his wireless connection patterns in his room. David, on the other hand, has five Gig ADSL connectivity, which implies that cost is not a factor in his lower web use at home compared to his use on campus. David also intimated in his interview that to his knowledge, only two other people in the multimedia class have web access at home. An examination of the questionnaires completed in class also revealed that another two students, who were not interviewed, have web access at home. One of these students indicated in his questionnaire that he accesses the web 3–4 hours per week in the lab and 24 hours a week at home. The second student, who was also not interviewed, indicated in his questionnaire that he spends 5–6 hours per week on the web in the lab and the same number of hours on the web at home.

As can be seen in **Table 4.4**, eight of the ten students have Wap-enabled phones, yet all of them reported in their questionnaires that their two main uses of their cell phones are for social purposes or listening to music. Only three of the ten students gave information-

seeking as one of their three main cell phone uses. Cyril (HU), David (RHU) and George (LU) indicated that their third most common use of their phone would be to look for information. Thabo (RHU) does not have a Wap-enabled phone and Mpumi (LU) does not have access to a phone at the moment.

Several of the students in this study indicated that their use of a cell phone for academic purposes is minimal and that they do not like accessing the web via their cell phones because the screens are too small. Students who were able to give an estimate of how much of their cell phone time is spent on accessing the web for their studies gave estimates of 10, 15 or 20%. Of the two students who do not have Wap-enabled cell phones, one, Mpumi, lives off campus and the other, Thabo, has web access on campus. Mpumi has had access to a cell phone sporadically. However, she reported that when she had access to the phone, she used it mainly for social purposes. All of the students with Wap-enabled phones indicated in the interviews that they would only use their cell phones for their studies to quickly check something but never for extended periods of time. **Table 4.4** also indicates the three main activities for which the students use their cell phones in order of importance, as was indicated in their questionnaires.

**Table 4.4*****Student use of Wap-enabled phones***

Student name	Wap-enabled phone	Main use of phone
John	Yes	1. Calls 2. SMS 3. Music
Cyril	Yes	1. SMS or IM 2. Calls 3. Looking for information
David	Yes	1. SMS 2. Calls 3. Looking for general multimedia information
Sipho	Yes	1. Calls 2. Social networking 3. SMS
Thabo	No	1. Calls 2. SMS
Thandi		1. Calls 2. SMS 3. Music
Mpumi	No phone at present	
Vusi	Yes	1. Music 2. Social networking 3. SMS
Clyde	Yes	1. Calls 2. SMS 3. Music
George	Yes	1. Calls 2. SMS 3. Looking for info. to help me with assignments

**4.3.1 Demographic factors**

In this section, I will look at the findings regarding the participants' age, the type of schools they attended, their years of experience with the web, the educational background of their parents, gender, and family support for technology.

As can be seen in **Table 4.5**, there does not seem to be any correlation between the age of the participants and high use of the web to supplement and enhance formal course work and skills. The two highest users, John and Cyril, are 20 years old, while three of the low users, Mpumi, Thandi and George are also 20 years old. David, a relatively high user is 22 and Clyde, a low user is 22. Thabo and Sipho, who make relatively high use of the web to supplement and enhance formal course

work and skills, are 23, as is Vusi, a low user of the web to supplement and enhance formal course work and skills.

As mentioned in the literature review, former Model C schools were much better resourced under apartheid and this situation has not changed much. It was thought that students who went to better resourced and better staffed schools, such as former Model C schools, would spend more time on the web than those students who went to under-resourced schools, not only because the first group might have had better access to computers, but also because of better trained staff. However, it does not seem as if this factor plays a role in respect of this particular group as far as the students' use of the web is concerned. *Table 4.5* shows that John and Cyril, two high users, both attended former House of Representatives (HoR) schools, as did Thandi and George, two low users. David, Clyde and Vusi all attended former Model C schools. David (RHU) is a higher user than Clyde and Vusi.

**Table 4.5.**

***Comparison of demographic factors***

Student	Age	Type of school	Years of web experience	Years of computer experience	Educational background of mother/father
<b>High users</b>					
John	20	Former HoR school *	3-4	5-6	Degree
Cyril	20	Former HoR school	3-4	10+	Matric
<b>Relatively high users</b>					
David	22	Former Model C school **	4-5	6-7	National Dipl.
Sipho	23	Former DET school ***	4-5	9-10	Doesn't know
Thabo	23	Former DET school	2-3	2-3	Matric
<b>Low users</b>					
Thandi	20	Former HoR school	7-8	7-8	Degree
Mpumi	20	'Elite' township school ****	5-6	5-6	Parents deceased
Vusi	23	Former Model C school	10+		Postgraduate
Clyde	23	Former Model C school	6-7	10+	Matric
George	20	Former HoR school	4-5	9-10	Matric

\* Former House of Representatives or traditionally coloured school.

\*\* Former Model C or traditionally white school.

\*\*\* Former Department of Education and Training (DET) or traditionally black school.

\*\*\*\* Mpumi described her school as an 'elite' school – a STEM or Science, Technology, Engineering and Mathematics school which prepares students for university.

Sipho and Thabo are higher users of the web for self-study than Mpumi who attended a special township school that prepares students for higher education. In Mpumi's case, she described the school as an 'elite' school catering for deserving students from surrounding schools, whereas Sipho and Thabo's schools were situated in small towns. In Thabo's case he had no access to computers or the web at his school and only started using a computer and the internet when he started his studies.

Students in this study do not use the web more if they have more experience with computers and the web, as can be seen in **Table 4.5**. Cyril (HU), Vusi (LU) and Clyde (LU) have more than ten years of computer experience, yet only one student, Cyril, is a high web user and the other two students are not. Thabo (RHU) is the only student who had no computer experience prior to university, yet he is a higher web user than, for instance, George (LU) who has 9-10 years of prior experience. Mpumi (LU), Clyde (LU), Thandi (LU) and Vusi (LU) all have more than five years of web experience and are low users of the web to supplement and enhance formal course work and skills. Vusi (LU) has more than ten years of web exposure compared to, for instance, John (HU) and Cyril's (HU) 3-4 years, yet Vusi is a low user of the web to supplement and enhance formal course work and skills, and John and Cyril are high users.

The educational level of the students' parents does not seem to play a role in their use of the web to supplement formal course work and skills as indicated in **Table 4.5**. A high user (John), and relatively high user's parent (David) have a postmatric qualification. The same applies to two low users, Thandi and Vusi's parents. In the case of the two high web users, Cyril and John, the mother or father has a matric qualification and degree respectively. Vusi (LU) is the only student who has a parent with a postgraduate qualification. Yet, he is lower user of the web for self-study than Thabo (RHU), whose parent has only matric.

In terms of gender, the two female students interviewed for this research, Thandi and Mpumi, were both low users of the web for self-study. Only two female students were interviewed but then there were only three female students in this class, which made it difficult to come to any definite conclusions regarding the role of gender in the high use of the web for self-study.

A mixed picture emerges in terms of family support, as can be seen in *Table 4.6*. However, it should be noted that students were not expressly asked whether their parents support their use of technology. Instead, they were questioned about their parents' role in their motivation and support for their multimedia studies, and whether their parents put a lot of pressure on them to perform. In this regard, one high user, John felt that his parents do not show as much support as he would have wanted them to, whereas Cyril (HU) reported that his family has high expectations in terms of his studies.

David, the only student among those interviewed who has a web connection at home, stated that his parents support his studies 100% and acquired ADSL when he asked for it in support of his studies. Thabo, a relatively high user, and Mpumi, a low user, do not have parental involvement, in that they both grew up with other family members. Thandi, a low user, was the only student who indicated that her friends and family question the usefulness or 'status' of her multimedia studies.

#### **4.3.2 Summary of demographic factors relevant to high use**

The most surprising factor that emerged from the research of factors relevant to high use of the web for self-study was the fact that the four students with most web experience were low users of the web to supplement formal course work. The fifth low user had as much web experience as two relatively high users but still more than the two highest users. Another interesting factor is that the one student among the interviewees who has web access at home, and the student with a wireless connection in his room, still used the web more in the lab than at home or in the residence. There does not seem to be a relationship between students' age, schooling, parents' educational background, gender, and family support in whether the students are high or low users of the web to supplement and enhance formal course work and skills.

**Table 4.6**

**Parental role in motivation and support for multimedia studies**

Student	Student response when asked if parents play a role in their motivation for their studies or pressurise them to perform
<b>High users</b>	
John	<i>I want my mother to put more pressure on me. ... If I had pressure from him (my father), it would be like, Yes! Yes! Burning fire!</i>
Cyril	<i>They're fine as they are... . My parents are: 'You have to get an education'. They were very firm. 'You have to get to matric and after that then study and always to be the A student'.</i>
<b>Relatively high users</b>	
David	<i>I was fortunate enough to get it (ADSL) from my parents 'cause I asked them... which they didn't mind because they back me up 100% with my studies.</i>
Sipho	<i>No, my parents are not putting any pressure or like that because I always pass.</i>
Thabo	<i>Never, nothing. I don't even show my parents my marks. (Did not grow up with parents).</i>
<b>Low users</b>	
Thandi	<i>The pressure they put is too much. They have all these expectations. <b>Earlier comment:</b> People tend to make fun of my course a lot... .Even at home. My father doesn't understand why I'm studying multimedia.</i>
Mpumi	<i>I won't say they (extended family) motivate me. They're just there. All they care about is whether I pass (family she grew up with).</i>
Vusi	<i>Their motivation also helps my motivation. Like succeeding in life and being recognised as a multimedia technologist and doing my best in everything that I do.</i>
Clyde	<i>... My parents have been pressuring me since school but nowadays they've eased off, so it's much better not having to worry about that as well.</i>
George	<i>It helps because it just shows that they're interested in what you're doing. And they want me to succeed one day.</i>



### 4.3.3 Other factors relevant to high use of the web

All of the students reported that their lecturers regularly encourage them to use the web not only for their formal, assessed work, but also to solve problems or to research issues that they do not understand. Thandi reported in the interview that one of the lecturers refers to the search engine Google as ‘Professor Google’.

In terms of general web use patterns that may affect formal academic use or use for self-study, the following findings were made. Some of the students in this study seem to access the web and internet regularly for purposes *unrelated* to their studies. However, it was found that the high users of the web to supplement and enhance formal course work and skills, John and Cyril, access the web predominantly for purposes *related* to their studies.

As can be seen from **Table 4.7**, students in the multimedia class as a whole make extensive use of the social communication affordances of the web. When looking at information from the questionnaire completed by 19 of the 23 students in the class, 32% of the students indicated that they access social networking sites a few times a day and 37% indicated that they access their e-mail a few times a day. In comparison, only 21% indicated that they access the web a few times a day for information to help them understand class work, and only 16% indicated that they do so a few times a day for assignments. Thirty-seven percent indicated that they search for inspiration for the multimedia course a few times a day. However, this activity could include anything ranging from looking at the design of pop-up advertisements to taking note of the layout of the particular site they are visiting.

**Table 4.7****General web use patterns for multimedia class**

	A few times a day	Every day/Almost every day	A few times a week	Once a week	Twice a month	Less than once a month	Never/Almost never	Not marked by students
<b>Social networking (Facebook, Twitter etc)</b>	32%	37%	16%	0%	5%	5%	5%	0%
<b>Logging onto the WWW to access my e-mail account</b>	37%	47%	11%	5%	0%	0%	0%	0%
<b>Music</b>	0%	11%	26%	5%	0%	16%	42%	0%
<b>Information on the latest gadgets, including prices etc.</b>	0%	0%	42%	11%	5%	32%	11%	0%
<b>Sports information</b>	5%	21%	16%	11%	0%	5%	42%	0%
<b>Information to help me understand class work</b>	21%	37%	37%	0%	5%	0%	0%	0%
<b>Information about the weather</b>	5%	5%	5%	5%	5%	11%	63%	0%
<b>The latest entertainment news</b>	0%	11%	16%	21%	0%	37%	16%	0%
<b>New technological trends</b>	5%	21%	26%	11%	16%	16%	0%	5%
<b>Information to help me with assignments</b>	16%	32%	42%	11%	0%	0%	0%	0%
<b>Online newspapers</b>	11%	11%	26%	11%	5%	5%	32%	0%
<b>Search for inspiration for the multimedia course</b>	37%	16%	26%	0%	11%	5%	0%	5%
<b>Online magazines</b>	5%	0%	16%	5%	5%	5%	63%	0%
<b>The latest fashions</b>	0%	5%	5%	5%	5%	21%	53%	5%
<b>Information to teach me new multimedia skills</b>	26%	26%	21%	16%	11%	0%	0%	0%
<b>Medical information</b>	5%	5%	0%	0%	16%	11%	63%	0%
<b>Games</b>	5%	11%	0%	11%	32%	5%	37%	0%.

When examining the activities students engage in a few times a day, every day or almost every day, it can be seen that 69% of the students who completed the questionnaire indicated that they access social networking sites on this basis, 84% reported using e-mail this frequently, 58% reported accessing the web for information to help them understand class work at this frequency, 48% to help them with assignments, and 52% indicated that they access the web this frequently for information to teach them new multimedia skills (see **Table 4.8**). The last

figure, however, is doubtful when measured against students' responses to the open-ended question in the survey, asking whether they have taught themselves multimedia skills not included in the course. It is clear that the most frequently undertaken use of the web for the class as a whole is social networking and e-mail.

**Table 4.8**

*Selected web use patterns of multimedia class*

	Few times a day/Every day/Almost every day	Few times a week	Seldom	Never/Almost never	Not marked
Social networking (Facebook, Twitter etc)	69%	16%	15%	5%	0%
Logging onto the WWW to access my e-mail account	84%	11%	5%	0%	0%
Information on the latest gadgets, including prices etc.	0%	42%	48%	11%	0%
Information to help me understand class work	58%	37%	5%	0%	0%
New technological trends	26%	26%	43%	0%	5%
Information to help me with assignments	48%	42%	11%	0%	0%
Search for inspiration for the multimedia course	53%	26%	16%	0%	5%
Information to teach me new multimedia skills	52%	21%	27%	0%	0%.

Emerging from the interviews, is that John and Cyril – the two high users of the web for self-study, and one relatively high user, David – report no use, or almost no use of social networking sites such as Facebook. Siphon reports that 10% of his time is spent on Facebook and e-mail. As reflected in **Table 4.9**, Thabo is the only one of the five high or relatively high users who reports spending significant time on Facebook, i.e. 30% plus an additional 15% on e-mail and information not related to his studies.

**Table 4.9*****Social networking use compared to other web use patterns***

Student	Student estimate of web time spent on self-study (%) *	Web use for formal course work (%)	Social networking and e-mail (%)	Other uses unrelated to studies (%)	Unallocated (%)
<b>High users</b>					
John	65	35%	'... Facebook is completely irrelevant'	-	-
Cyril	55	40%	5 (e-mail); Facebook – 'I don't have time for folly'	-	-
<b>Relatively high users</b>					
David	30	40	10-15 (e-mail); '... don't do Facebook at all'	15	-
Sipho	20	45	10	15	10
Thabo	No fixed estimate	45-50 'Mostly not for assignments'	35	10	-
<b>Low users</b>					
Thandi	5	60	35 - 'I think I'm addicted to Facebook'	-	-
Mpumi	Maybe once a week	85	15	-	-
Vusi	10	78	7	5	-
Clyde	Twice a month	45-50	40-45	10	
George	5-10	40	40	10.	

\* In the interviews students were asked to give a breakdown of their use, but if they were unable to do so after several attempts, they were not pressurised.

Of the five students who spend the least time on the web, four reported significant time spent on social networking. The fifth student, Vusi, estimates that 7% of his time is spent on Facebook and e-mail combined and an additional 5% on material unrelated to his studies. However, in his questionnaire he indicated that he accesses Facebook a few times per day. This casts doubts on the estimate he gave during the interview. George spends 40% of his web credits on Facebook and e-mail and another 10% on information unrelated to his studies. Thandi spends 35% on Facebook and e-mail. Clyde spends 40 – 45% of his credits on Facebook and e-mail and an additional 10% on information unrelated to his studies. Mpumi estimates that 15% of her credits are spent on Facebook and e-mail, yet in her questionnaire, she indicated that she accesses Facebook, e-mail, entertainment

news and games every day or almost every day. These are also her most frequent activities on the web according to her responses in the questionnaire.

It should be noted that all students could very well have under- or over-estimated their web use for specific purposes, but the picture that emerges from the questionnaire generally corresponds to students' spontaneous interview statements indicating high or low use of the web to supplement and enhance formal course work and skills.

It became clear during the interviews that all of the high and relatively high users of the web were interested in achieving more than simply meeting course requirements, i.e. passing assignments and tests. All of these students made regular and spontaneous statements regarding learning more than what is required of them to pass the course. The high and relatively high users would, for instance, make the following statements:

John (HU): *I further my studies basically on the subject but not what they want. But more what I'm adding to it... So when I get for instance an HTML project, then I always want to go above and beyond what they ask for. Because I know I can do HTML, I can do my CSS ... but everybody in class can do that. So there's no point in me doing just the bare minimum.*

Cyril (HU): *It is a foundation into the field. And it is up to me, like the experts in the field, to better myself.*

David (RHU): *... I spend a lot of time on the self-teaching as well. I will teach myself other programmes at the same time, that we're not being taught at university ... . I'm totally against sticking to what they teach you here.*

Thabo (RHU): *Ja, there are some who rely on lecturer notes and things. They still pass but they don't excel and they wonder why because they don't get up and work and practise what they are taught and even go further.*

In the interviews of students categorised as low web users for self-study, there was an absence of spontaneous statements about a deeper interest in the course than

merely meeting the academic requirements. A lower user such as Mpumi stated emphatically and repeatedly throughout the course that she just does not want to fail. When she was asked what kind of thoughts she has when thinking of her studies, she replied:

*I want to pass. I don't want to repeat. That's one thing since I was in grade R. I hate repeating. I don't want to repeat and I never repeated.*

Low web users' statements in terms of doing work over and above course work would be vague. For example, George, a low user, describes his efforts at self-study, i.e. work that will not be assessed, as follows:

*It happens, not on a daily basis, but when I get free time, I'll do it. Or do any research on stuff I'm busy with, busy studying.*

As can also be seen below in the discussion about self-regulation, the low users of the web all tended to have an extrinsic goal orientation, i.e. what is most important to them is not the learning process itself but good grades or merely getting a qualification. Thandi says for instance, 'Marks, I just think high marks'(when working on an assignment). During the interviews, it became clear that the low users' academic web use, centred around the submission of assignments, that is, apart from their high use of the web for social networking, e-mail or material unrelated to their studies. Mpumi says:

*Sometimes I have two weeks for an assignment and I think, I still have a lot of time. So I think, just let me search or let me just send e-mails to people. Friends. And most of the time, just checking the movies and YouTube and that.*

In terms of their attitude towards the web, students were asked in the questionnaires, to indicate which one of five statements they would use to describe themselves. The five statements and students' choices are given as headings in **Table 4.10**. Seven students indicated that they 'are crazy about the WWW'. Two students, Vusi and Thandi, indicated that they 'use the WWW when they have to'. Mpumi said that she 'uses the web but it's not a big part of her life'. All of the high and relatively high users indicated that they are 'crazy about the web', and only two of the low users indicated the same.

**Table 4.10****Attitude towards the web**

	I use the WWW when I have to	I'm crazy about the WWW	I can live without the WWW	I use the WWW but it's not a big part of my life	I don't like using the WWW
<b>High Users</b>					
John		√			
Cyril		√			
<b>Relatively high users</b>					
David		√			
Sipho		√			
Thabo		√			
<b>Low users</b>					
Thandi	√				
Mpumi				√	
Vusi	√				
Clyde		√			
George		√			

In terms of ease of use, students were asked in the questionnaires to indicate how hard or easy it is for them to find information on the web. The five options serve as headings in **Table 4.11**. The last column contains students' answers to a second question, namely, asking what they do when they cannot immediately find the information they are looking for on the web. In terms of ease of use, Sipho (RHU), John (HU), Cyril (HU) and Thabo (RHU), indicated that it is easy or very easy for them to find information on the web, while David, Mpumi and George indicated that they 'manage' when looking for information. In terms of persistence when searching for information, Vusi and Thandi, two low users, indicated that they ask somebody if they cannot immediately find what they are looking for. Clyde is the only student who indicated that he searches for a while but then stops looking if he cannot find information immediately. However, he says that it is very easy for him to find information. Despite saying in her questionnaire that she manages to find

information, Mpumi spontaneously mentioned in the interview that she has doubts about her ability to find information on the web.

**Table 4.11**

***Ease of use***

	Very hard	Hard	Manage	Easy	Very easy	What do you do if you can't find the info immediately?
<b>High Users</b>						
John				√		Keep on trying
Cyril					√	Don't stop until I find it
<b>Relatively high users</b>						
David			√			Don't stop until I find it
Sipho				√		Keep on trying
Thabo					√	Don't stop until I find it
<b>Low users</b>						
Thandi					√	Ask somebody to help me
Mpumi			√			Keep on trying
Vusi				√		Ask somebody to help me
Clyde					√	Try for a while but then stop
George			√			Don't stop until I find it.

In summary, when looking at the group as a whole, it does not seem as if this group has difficulty finding information. However, three of the five students who spend minimal time on web use to supplement and enhance formal course work and skills said that they only use the web when they have to, or that it is not a big part of their lives. Clyde indicated in his questionnaire that he is 'crazy about the web' but in his interview he stated that he does not like searching for information on the web because 'it is too big' and it 'get's confusing'. In George's case, he indicates that he is 'crazy about the web', yet he spends the third least time on the web. Vusi is the only student of the five low web users for self-study, who spends substantial time on the web despite stating that he only uses the web when he has to.



#### 4.3.4 Summary of other factors relevant to student web use

Of the ‘other’ factors that might affect web use among the students, it appears as if other uses of the web, such as social networking and other social communication such as e-mail, could have an influence on the use of the web to supplement and enhance formal course work and skills, i.e., if it is assumed that students spend less time on the web for study purposes because other uses distract them. Four of the five low users reported spending substantial time on Facebook and e-mail. Only one of the high or relatively high users reported spending substantial time on Facebook. The web use of all the low users appears to be attached to the completion of assignments, i.e. components that are directly assessed.

All the students reported that their lecturers regularly encourage them to use the web. Four of the five high and relatively high users indicated that they have no difficulty in finding information on the web, while the fifth indicated that he ‘manages’. Of the five low users, one indicated that she sometimes struggles to find info, another that he stops searching if he cannot find what he is looking for, and two others said they ask somebody to help them when they cannot find information. Only one of the low users indicated that he ‘manages’ when looking for information. Three of the five low users indicated that they either use the web when they have to, or that it is not a big part of their lives. The other seven students all indicated that they are ‘crazy about the web’.

#### 4.4 *The role of self-regulation in web use*

In this section, I will look at the findings in terms of the third research question which centres around the role of self-regulation in third-year multimedia students’ use of the web to supplement and enhance formal course work and skills. **Table 4.12** sets out the processes or elements of self-regulation investigated in this study. The table and analyses of the students’ interviews are based on a combination of Pintrich et al. (1991) and Zimmerman’s (2002) models or frameworks of self-regulation. Only the most notable aspects of self-regulation are covered in the findings and not all aspects of the two models discussed in the literature review are included.

**Table 4.12**

***Self-regulated processes included in the findings***

<b>Motivation</b>
Goal orientation (Intrinsic or Extrinsic) Task value beliefs Outcome expectations (or control of learning beliefs) Self-efficacy Affect (e.g. test or assignment anxiety)
<b>Metacognitive processes</b>
Goal-setting Planning Self-monitoring Self-judgement (incl. self-evaluation & causal attribution) Self-reaction
<b>Resource management strategies</b>
Time and study environment Effort regulation Peer-learning Help-seeking

The main finding, which will be set out in detail in the sections below, is that the two high users of the web, John and Cyril, stood out in terms of high self-regulation and they will be classified as high self-regulators for the purposes of the study (**Table 4.13**). These two students appear to be self-regulated with regard to all aspects of their course including programming, which most students in every multimedia class dread.

**Table 4.13**

***High, relatively high and low self-regulators***

High self-regulators	Relatively high self-regulators	Low self-regulators
Cyril (HU) *	Sipho (RHU)	Thandi (LU)
John (HU).	Thabo (RHU)	Mpumi (LU)
	David (RHU).	Vusi (LU)
		Clyde (LU)
		George (LU).

\* The abbreviations in brackets refer to students' use of the web to supplement and enhance formal course work and skills.

As will be shown in the sections below, Thabo, Siphon and David can be classified as relatively high self-regulators in that they appear to be self-regulated with regard to most aspects of the course. However, they admit to spending less time on aspects of the course that they do not like, such as PHP programming. Mpumi, Thandi, Vusi, Clyde and George can be classified as low self-regulators, especially in terms of the motivational aspects of self-regulation and the metacognitive processes of self-regulation. The picture regarding behavioural aspects or resource management strategies seems more mixed as will be shown in the sections below. As can be seen from **Table 4.13**, the students who are high web users to supplement and enhance formal course work and skills are also high self-regulators.

It should be emphasised that the purpose of the study is not to determine the level of the students' self-regulation *per se*, but rather to determine the relationship between self-regulation and multimedia students' use of the web to supplement and enhance formal course work and skills.

#### **4.4.1 Motivational processes**

As mentioned in the literature review, crucial to theories of self-regulated learning is the idea that learning and motivation are interdependent processes that cannot be separated from each other. The findings from the research suggest that students who engage in high use of the web to supplement and enhance formal course work and skills also have high motivation, especially in terms of an intrinsic interest in their studies and high self-efficacy beliefs. These two aspects, together with task value beliefs, outcome expectations and affect, form the main sub processes of motivation in self-regulation as represented in **Table 4.12**.

As set out in the first section of this chapter and in **Tables 4.2 and 4.9**, John (HU), Cyril (HU), Thabo (RHU), Siphon (RHU) and David (RHU) – the high and relatively high users of the web for self-study – reported that between 20% and 65% of their overall web use is for this purpose. The hours that they spend using the web for self-study also amounts to more than double the hours spent by low users of the web for self-study. As pointed out in the literature review, having an intrinsic goal orientation means that the student's engagement in a task is an end in itself rather than being a means to an end such obtaining good grades or a qualification. The high

self-regulators and relatively high self-regulators all made regular statements indicating that they have an intrinsic interest in their studies, regularly engage in practising or experimenting with their work, and derive pleasure or satisfaction from their studies. Even though he does not like PHP, John, for instance, declares that he is not a ‘fan’ of PHP but ‘like when I’m doing my CMS, my content management systems, then I find PHP extremely useful. Then I love PHP’.

In terms of goal orientation, these students have an intrinsic interest in their studies and try to do more than what is expected of them to pass the course. They have a real interest in the content of the course itself and the mastery of the course, and they study even when they do not have assignments to complete. For example:

John: *Like most of the stuff I download is for my personal use... . I further my studies basically on the subject, but not what they want. But more what I’m adding to it.*

Cyril: *... as with anything in life, when obtaining knowledge it is crucial to go further than what is taught to you if possible and with multimedia it is always possible.*

Cyril states that his motivation comes from within himself because he has to please himself and not other people. David sees his studies as part of a bigger goal:

*I’m totally against sticking to what they teach you here. You can take that in, but I will go for browsing, a lot of browsing and self-teaching. Because I do it and I learn a lot from that.*

John relates his ‘fits of inspiration’:

*I suddenly get an idea and then I want to apply it. Like creative inspiration, more or less.*

Thabo describes practising his skills:

*... I think you really have to do a lot of research. The more you practise, the more you get ... And klaar.<sup>1</sup> So I think researching works for me.*

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<sup>1</sup> Forms part of the South African slang expression ‘Finish en klaar’, which is used to emphasise a point. ‘Klaar’, an Afrikaans word, literally means ‘finish’. In this context the expression means ‘full stop’ or ‘it is not a debatable point’.

As indicated by the quotes above, throughout their interviews the high and relatively high self-regulators made regular references to actively searching for information on the web for self-study, practising their skills, or experimenting to see whether they could emulate work that they see on the web. Sipho describes what his self-study involves:

*Let's say maybe I see something maybe when I'm browsing. Maybe a Flash animation or so. Maybe I want to do something similar. Then I'll try it and if I can't do it, I'll check on the 'how to use' and then I'll get forums ... Maybe I'll download there, then start playing around.*

The low web users who engage in less than 10% use of the web to supplement and enhance formal coursework and skills appear to have lower motivation. They mainly have an extrinsic goal orientation, i.e their interest lies mainly in what the course would eventually bring them and not so much in the content of the course or its mastery. The focus of their studies appears to be social status or achieving high marks in assignments, or even just passing. For example, George describes his motivation for his studies as follows:

*What motivates me is [that] I want to start a family one day and I don't want to be like someone who has to struggle to get money to do this or that. I want to be on my own feet, do what I wanna do one day and do it through my studies ... That's what motivates me, to be independent of my parents. That's all.*

Thandi states that she motivates herself but she describes her motivation in vague terms: 'I always wanna do better'. In their interviews, the low users and self-regulators made hardly any references to engaging with the web for study purposes, unless they were busy with assignments. They admitted to not engaging in self-study on a regular basis. For instance, when Clyde is asked how often he would sit down with an aspect of the course he struggles with, he declares, 'not very often'. Thandi says, 'once in a while'. When questioned about the 1 – 2 hours she spends on the web in the lab per week, Mpumi says, 'I like it [the lab] very much but I prefer going home early'. She is also straightforward about her use of an internet café close to her home:

*To be honest? I've only done one ... for my assignment at the internet café.  
Most of the time, I just go for other things.*

Thandi seems very aware of other people's perceptions of her course, her work and her marks. She says:

*... people tend to make fun of my course a lot. They say it's for lazy people... Even at home. My father doesn't understand why I'm studying multimedia. ... I always think about the future I have in the career I've chosen ... I do love it, but I think what opportunities do I really have out there having studied multimedia?*

She also states that the pressure her family puts on her makes her work harder 'so that I can make them proud'. Mpumi's main concern is not to fail. 'I want to pass. I don't want to repeat.' When asked what motivates him, Clyde gives a similar response to George:

*What motivates me is knowing that I have an ideal in my life ... What motivates me is that perception of where I see myself in ten years with a nice house, a nice car, or my family. That keeps me going.*

Although Clyde reports a strong interest in PHP he derives great satisfaction from the fact that he can do what his class mates are unable to do or find very difficult. 'I think it's also the feeling I get when I get it done. I know it was so hard nobody else could do it but I got it done'. He also casts doubts on his real interest in PHP when he states that if he had a choice between PHP and Java, he would have chosen Java because it is easier. He also feels that he should go into PHP because he has a diploma in it. Vusi makes a few statements about the satisfaction he gets from his studies, which could be indicative of an intrinsic goal orientation, but his lack of action seems to indicate that his self-regulation skills are lacking. He describes his motivation as follows:

*Like succeeding in life and being recognised as a multimedia technologist and doing my best in everything that I do.*

David and Sipho, two of the three relatively high self-regulators, state that getting higher marks than other students are unimportant. However, Thabo feels that he

does get motivation from ‘competing with somebody or some website that I have seen’. When asked what motivates him, Sipho states:

*Seeing other people’s work. Seeing this website. You think, it was done by a person just like you. And looking at other students’ portfolios or maybe overseas multimedia students. What they’re doing in their portfolios. That motivates me.*

Interestingly, John and Cyril, the two high web users for self-study and the two high self-regulators, also have a high extrinsic goal orientation in addition to an intrinsic orientation. These two students both indicated that they derive satisfaction from competing with students on their own level, i.e. among themselves. John, for instance, declares that apart from his main competition, Cyril, he ‘manifests’ a rival:

*Even if I’m better than the person, I’ll find something to beat. And in first year, I didn’t have a rival, so I looked on the internet. I saw people’s websites, so I was like if you made this, I can be better than you. So I started working.*

In terms of task value beliefs or the individual’s perception of the importance or usefulness of a task, the two high users for self-study and high self-regulators, John and Cyril, both indicated that although they are more interested in design, they also work hard in other aspects of their course, as can be seen from John’s statement about ‘loving PHP’ when he has to build a content management system. Cyril for instance states that he only ‘excludes things when I’m doing things on my own, doing it for myself.’ He feels that for him as individual it is not enough to only learn what is presented in the course. ‘I want to further myself’.

Low users and self-regulators such as George indicated that ‘there are aspects of the course that you can leave out if you know you will not be using it in your job’. In general, most students interviewed could see the importance of all aspects of their course but several students indicated that they do not spend as much time on aspects of the course that they do not like, such as PHP programming, as they would on aspects that they enjoy, such as web design. Mpumi felt that she would rather not use templates but learn to ‘design from scratch’, which indicates that she does see the value of putting in her own effort. This statement was initially thought

to be indicative of an intrinsic goal orientation, but her repeated statements on not wanting to fail confirmed her orientation towards meeting formal course requirements.

In terms of outcome expectations, the low self-regulators either have doubts about the outcome of their efforts for assignments or particular aspects of the course, or they have doubts about the value of their qualification. Similar to Thandi's statement above in which she expressed doubts about the opportunities that will be available with a multimedia qualification, Vusi states:

*I just sometimes fear that when I go into the workplace and I bring the certificate or something, will it be enough for the company that I'm working for? Will my knowledge be enough? Won't there be other trainees doing the same work and they have more knowledge than what I gained from here?*

Students are more likely to study strategically and effectively if they believe that their efforts will make a difference to their learning. Also important is the students' belief that their learning depends on their own efforts as can be seen from Thabo's statement quoted below. George expects mostly average marks and in some subjects marks that are 'good enough' for him. Mpumi and Thandi expect to fail when they do PHP. The high self-regulators and relatively high self-regulators all feel that they will do well or above average because of the additional effort that they put in.

Self-efficacy, or students' belief in their abilities to study and achieve, is crucial to self-regulation and achievement. John and Cyril, the two high self-regulators, and high users of the web for self-study, stand out in that they do not express doubts about their abilities in any aspect of their studies. John says:

*I'm generally confident about everything, the only thing I'm not that confident in is PHP, but it's not my inability to do it. I'm not confident in myself enough about wanting to expand my knowledge. My PHP.*

But he states that he usually gets the highest mark in the subject. Cyril claims that his self-confidence is not very high but says that he counters this with constructive self-talk. However, he still states:



*Coding in SQL is the only difficulty I can think of. The rest seem pretty easy or rather I can cope with it.*

David and Thabo's self-efficacy beliefs are fairly high but both students lack confidence in their abilities to master a specific aspect of the course, namely PHP. However, David says:

*I don't stress myself about doing difficult things, I just take it as I can learn new things for the future, something new I can use.*

Sipho generally seems confident but he lacks confidence in his abilities to work fast: 'Ja, if I have time, a little bit of time then I know that I can do this'. He also expresses a lack of interest in PHP and admits that he does not put a lot of effort into the topic.

Thabo feels generally confident about his ability to handle difficult tasks and getting good marks. He says:

*'Cause I always aim for the moon, so I land on the stars... .When it comes to PHP I lack a bit but if I have to do difficult things, I push, push, push. So I'd say 70%, higher maybe 80 plus.*

The students who display lower levels of self-regulation also display low self-efficacy. George does not appear to lack self-efficacy on the surface. However, he does not make any statements that could substantiate his belief in his abilities. What is evident though, is that much of his self-efficacy beliefs are based on the availability of help from others. He mentions a few times that he asks for help. When asked how confident he is about his abilities to do well in industry, George says:

*I feel confident about that... . Some people tend to help you quite well, always friendly in certain environments. So, I feel quite confident that when I struggle or when I can't do a technical thing they will help me.*

Thandi states that she 'thinks' she can 'manage' but, like Mpumi, she attributes her problems with PHP to a lack of ability and feels that even when she works hard she still fails PHP:

*It's the practical. It's just I always fail PHP... . When I study, when I do research, it doesn't really help I always fail.*

The ratings that students gave themselves in the interview regarding their beliefs in their abilities to do well in their studies or handle difficult aspects of the course are revealing. John, who is the top student in the class, rates his abilities at a modest seven, while George who is a low academic performer rates his confidence in his abilities at 7 ½ or eight. As will be explained in **Chapter 5**, low performers often over-estimate their abilities, which leads to less effort on their part and, consequently, lower performance.

The high self-regulators do not seem to experience any obvious anxiety regarding their studies. Mpumi and Clyde, on the other hand, report high anxiety levels that appear to interfere with their self-efficacy beliefs and their general functioning. Mpumi describes her thoughts about her studies as follows:

*... when I'm at home. In my bed ... I need to do this. I need to get done with this. Eish. It's really waking me up. I can't cope, I can't sleep and then thoughts come back. You need to work on your PHP in order to pass. Because it works like that. I want to pass.*

Thandi's fear of PHP also seems to affect her ability to perform in the subject. Vusi states that, 'my nagging feeling is that there's too much that I still need to learn in this field'. George also does not display real anxiety about his studies but does say that when he has a lot of work to do he just wants to 'get it over with'.

#### **4.4.2 Metacognitive processes**

As indicated in **Table 4.12**, metacognitive processes or strategies can include goal-setting, planning, self-monitoring, self-judgement and self-reaction. Other aspects such as organisation and elaboration (mentioned by Pintrich and reflected in each interview analysis) will not be discussed in this section, as they were found not be significant to this study.

The two high self-regulators (John and Cyril) and three relatively high self-regulators (David, Sipho and Thabo) all displayed the setting of proximal goals that they then execute. As pointed out in the literature review, goals must be explicit and

not vague intentions. The high self-regulators all mentioned specific aspects of the course that they want to focus on in the short term and their goals involve practical plans.

For example, John, a high self-regulator, had a file ready for self-study during the university holidays and stated that he always has a particular topic that he searches for when he uses the web.

*I have a topic that I want to look at for the day. Like today I did a search for Flash portfolios, normal portfolios, JQuery portfolios. ... Tomorrow it might be searching for tutorials on Actionscript. But I never go to the web with an empty mind.*

Cyril, for example, starts with tutorials for beginners and works his way up. The two high self-regulators and the relatively high self-regulators said that they work through all the tutorials they download. David, a relatively high self-regulator, describes his modus operandi:

*I'll download what I can do in the same day. So'll download like six, seven of them and I'll do them all at the same time.*

The low self-regulators reported keeping tutorials for when they need them for assignments or when they struggle with something. When asked directly what their goals for their studies are, the low self-regulators would use vague terms to describe their goals or declare that their goal is to get their diploma, not fail or get good marks. When asked about his goals for his studies, George says:

*It's (my goal) just to better myself in what I do and just to get more on how stuff works in Flash. I like Flash a lot so I just wanna know more about how Flash works, so I want to .... (inaudible) ... stuff. I don't know. But that's basically it.*

When describing her goals, Mpumi is vague and has distal goals. She says:

*Well. Yes. I just wanna carry on with my studies and get my national diploma. Well I don't wanna fail. I don't wanna fail. I think I'll be wasting my year of studying if I fail. And explore and expand more in web design. I like web design. I don't know what to say.*

The high self-regulators and the three relatively high self-regulators regarded consistent self-study as part of their planning for their studies even when they do not have assignments. They start immediately or in time with their assignments, whereas low self-regulators such as Thandi, George and Clyde stated that they would procrastinate and postpone assignments. Thandi says:

*I tend to procrastinate. I do that a lot! I always say, ach, there's still two weeks left. I can sit back and relax. I tend to do that.*

They also felt that they work better under pressure, i.e. when they do not have much time left until due dates for submission. Thandi explains:

*I actually think I work better when I'm under pressure because then I have to do something. I have to push myself to do it when I have only two days to do it.*

Sipho, a relatively high self-regulator describes his planning as follows:

*I draw up a plan once I see there is a lot of work. Like the past two weeks we had assignments to submit so I draw up a plan and say on this day at this time I'd be doing this, and the next day I'll be doing this at this time.*

David, a relatively high self-regulator could, for instance, clearly describe how he tackles his work by breaking up assignments in stages and persisting until he finishes a particular stage. Clyde, on the other hand, would regularly refer to working when he 'gets a chance'.

In terms of self-monitoring or cognitive tracking of personal functioning the two high self-regulators, Cyril and John, consistently and repeatedly made statements indicating a high level of self-monitoring. John is able to explain exactly what goes through his mind when he engages in a challenging task:

*Is your logic correct? Conceptualisation. Do you follow the correct key words? Is your PHP structured properly?*

Cyril is also able to state exactly what he finds difficult in SQL, which is the only topic in the course that he finds challenging:

*Structuring of the code in the correct SQL sequence that will run the actual statement.*

Part of metacognitive processes is knowing what you do not know, and being able to explain what you do not understand. The low self-regulators tend to use vague terms and struggle to explain what they find difficult. When asked pertinently what he finds difficult about PHP, George explains:

*I think its almost like maths, you have to practise, practise, practise. And we don't always get the time to practise because we have other subjects and so on ... The individual stuff is fine to work with but once it all comes together that's when the mess up comes.*

Cyril does not only self-monitor when it comes to his studies, but actively monitors all aspects of his functioning and consistently works on self-improvement. When asked to describe his thoughts about his studies, he says:

*... it would be about, have I got any assignments, have I completed my assignments, what can I expect next in class, am I prepared for it and what can I do to improve my skills?*

In contrast, when asked directly what kind of thoughts go through their minds when they work on a challenging task, the low self-regulators typically responded with 'I give up;' 'I'm tired, I wanna go sleep;' or 'maybe I should leave this for tomorrow'.

As could be seen in the literature, self-judgement involves the ability to judge what one knows or does not know. The low self-regulators mostly found it hard to explain what they do not understand about the more demanding aspects of the course. Thandi for example, just kept saying, 'it's the practical'. Mpumi describes what she finds difficult about PHP:

*Oh, the practicals. Applying the codes I'm following. Maybe I'm told to do this. I understand the question but I cannot apply my knowledge. It's just difficult. If I tried, nothing works. We keep on working, working, working but nothing comes right.*

Self-judgement includes the evaluation of one's own skills compared to a set standard and knowledge, and self-reaction refers to an appropriate or inappropriate response to correct detrimental behaviour. The high self-regulators in this study would regularly make statements indicating that they consistently try to improve on their own efforts and performance. For example, John says:

*Like after every year, I see how my work have [sic] accumulated and then I say I wanna be better than this. And then in second year I saw I have some quite tough stuff to beat.*

The low self-regulators seem to stay in survival mode in terms of completing assignments and passing. They seldom made reference to improving their skills but would rather refer to passing their assignments. For example, Clyde describes how group assignments work:

*We don't really discuss much. It's more like just do your part, we throw it all together and we don't really understand what each other threw in, each one. It's not really like a group assignment, so that I sometimes feel it isn't really right. But I just do it because I need the assignment.*

George describes how he deals with a difficulty in a tutorial:

*I'll go and Google, just copy and paste it from the tutorial, see what comes up in Google.*

In contrast, as indicated in earlier sections, the high self-regulators engage in continuous self-study when they do not have assignments, try to excel and to meet more than the minimum standards for the course. They see the course as a starting point, feel driven to engage in learning over and above their class work and measure their progress in terms of standards they set for themselves. The low self-regulators seemingly regarded their passing of assignments as their only measurement of standard and of success and didn't refer to engaging in learning for pleasure or mastery, except to say, for instance, 'I love Flash' (George) or 'I love my course but...' (Thandi).

An important point with regard to self-reflection is causal attribution in terms of defensive or adaptive reactions, as mentioned above. The low self-regulators in the group tended to make excuses, such as not working as hard as they could because they do not have the web at home. For example, when Vusi was asked if he would have liked to do more of his own studying, he replied:

*Ja I would, I'd like to learn a lot of stuff that we're not taught here ... I wouldn't blame it on time exactly but after hours when I'm at home, I can't*

*go on the internet, 'cause there's no internet at home so I have to put it off for another day.*

When Vusi was asked whether he works through all his downloaded tutorials and what kind of tutorials he has, his response was:

*PHP tutorials, I have a couple... I have codes at home. I haven't looked at them seriously but I have lots of code.*

In contrast, the high self-regulators came up with solutions to the problem, i.e. downloading what they need when they are in the lab so that they could work at home. The low self-regulators also tended to blame lecturers' teaching methods more frequently for lack of understanding in class. Mpumi described one of her classes in the following way:

*She's (the lecturer) just sitting there like a baby-sitter. She never says out loud in class, 'I'm showing this'.*

When talking about procrastination, the low self-regulators would explain that they work better when they do not start with assignments ahead of time and were working under pressure. George explains it as follows:

*It's almost like I work better under pressure so, when there's a lot, I tend to do my best work under pressure.*

In contrast, several of the high self-regulators indicated that they no longer procrastinate in their third year, indicating that they correct behaviour that is detrimental to their functioning. Cyril describes his feelings about being responsible for your own learning:

*When you come to study this course or any other course, they just give you a foundation and you have to figure where you are going to put yourself. In this country ... a lot of people want everything just to be given to them and that's not how people made it in life. They had to go and figure it out for themselves.*

When asked what he does when he gets worse marks than he thought he should, John said that it did not happen often but when it did it was because he 'didn't put in the time'. He explains:

*And I figured that out. So I decided to stop that habit and put enough time in on my next project ... If I got worse marks than what I got before, then I have an internal problem with myself. Then I sort myself out.*

The low self-regulators tended to use vague terms when explaining how they intend to correct problems in their studies. When Thandi was asked to explain her thoughts when she gets lower marks than she expected, she said:

*... mostly I feel sad and I tell myself I'm going to work harder towards it...*

#### **4.4.3 Resource management processes**

Resource management strategies include managing time and study environment, effort regulation, peer-learning and help-seeking.

In terms of time management, the high and relatively high self-regulators made fewer references to experiencing stress when they have many assignments to do, whereas the low self-regulators regularly expressed distress about the amount of assignments they are expected to do during certain times of the year. Low self-regulators, like Thandi, George and Clyde, also admitted that they sometimes fall behind in their studies. George explains:

*It's almost like in the first few weeks of the term, it's almost like laid-back but at the end, everyone wants to give all their stuff at once. Like all the assignments and you must still study for exams.*

A mixed picture emerges in terms of structuring environments to optimise learning. Self-regulated students should be able to regulate time and study environment, such as working in a quiet place. Some students in the study would listen to music to 'relax' while others would listen to music to cut out distractions when they are working in the lab. When asked whether he listens to music while working, George, a low self-regulator explains:

*Ja, most of the time, but I use soft rock or so to just calm myself and start working ... I'll always have my ear phones there (in the lab) and if I don't have, I'll borrow somebody's ... mostly to shut out noise.*



The low self-regulators would express a preference for working without distractions, but the availability of help from others in the lab is more important to them than the distractions. Thandi states:

*I prefer working in my room. It's quiet but then there'd be a problem when I get stuck, then I have to walk to other people.*

The high and relatively high self-regulators such as David, Cyril and John prefer to work at home because help-seeking by other students distracts them. John says:

*Because people come to me talking about those and I don't want to hear ... they ask me stuff about the work and I'm like God, get away.*

In terms of help-seeking and peer-learning, what stood out among the high self-regulators is that they would first try to solve problems through their own efforts, whereas the low self-regulators would regularly refer to asking others to help them as a first resort, and they place a high premium on the availability of help from others in carrying out their tasks. When asked how he mostly solves problems, Vusi answers:

*Ask other people, it's the first thing I do, ask someone else if they've moved on from that problem. If not, then I'll go to the web.*

The high self-regulators emphasised wanting to come up with their own ideas whereas the low self-regulators like Mpumi, Thandi and George reported that they put a high premium on the opinions of others when working. David, for instance, prefers to design at home so that his ideas can be original and not copied by others in the lab:

*Its not like I have the best in class but at least I will have my own design 'cause if you bring it to class and people go: 'how far are you, can I see?' Then they'll use that type of layout.*

The low self-regulators also made disconcerting statements that indicated that their peer-learning endeavours and group work are not necessarily beneficial. Mpumi, for instance, explains how they work on one computer when working on a group assignment, whereas it is more typical for each member in a group to carry out his her function and to combine efforts for the end product. George and Clyde referred

to ‘*throwing everything together*’ when doing group work. The high self-regulators such as Cyril, John and David also referred to having to help other students, whereas the low self-regulators were all help seekers.

Clyde also helps other students with PHP because he has a background in PHP from school, but explains how he would regularly give up and ask somebody else to help him with other aspects of the course. He explains how he plans to work on his portfolio during the holidays but before having started, already foresees difficulties and plans to get the help of his friends with some aspects:

*I would get it to a certain point and then get X or Y to help me because they live close to me and they are more proficient in Flash than me.*

Although all the students reported that their lecturers regularly encourage them to ask for help and to use the web when they do not understand an aspect of the course, the low self-regulators have a preference for asking other students instead. Thandi explains:

*I can't remember asking them (lecturers) for help. 'Cause usually I always ask my classmates because ... I can always call from the IT centre and ask, 'can you come to the IT centre and help with this?'*

#### **4.5 Summary of findings**

The findings from the research suggest that self-regulation is the most important factor relevant to third-year multimedia students' use of the web to supplement and enhance formal course work and skills.

The two high web users and high self-regulators, who are also two of the three top achievers in the class, report that 55% and 65% respectively, of their total web use, is to supplement and enhance formal course work and skills. The relatively high users, whose second-year marks were among the 30% highest in the class, reported using more than 20% of their web time for self-study. The low users reported that 5 to 10% of their total web time was used for self-study. These students' marks were average to weak. Of these five low users, only one student spends substantially more hours on the web than the other four students do. However, his total hours spent on the web to supplement and enhance

formal course work and skills were still less than half the time spent by the relatively high user who spent the least time on the web for this purpose.

The two high users of the web can be regarded as high self-regulators in terms of all areas of their studies. Three other students, who can be classified as relatively high web users, can also be classified as relatively high self-regulators. However, these students did not seem to be self-regulated regarding all aspects of their course. The high and relatively high self-regulators reported regularly engaging with the web to supplement and enhance formal course work and skills, even when they had no assignments or tests.

The most important differences between the high and relatively high users, and the low users, with regard to self-regulation, were in terms of motivational and metacognitive processes. The high and relatively high users were found to have an intrinsic goal orientation. The low users and low self-regulators tended to have an extrinsic goal orientation, and their goals centred around getting a qualification and passing, or getting good grades. In terms of task value beliefs, the high and relatively high users felt that it was important to work on all aspects of their course, but they all enjoyed certain aspects of the course more than others. The low users and low self-regulators either expressed doubts about the outcome of their efforts or had doubts about the value of their qualifications. The high and relatively high users all appeared to have high self-efficacy and experienced low anxiety with regard to their studies and abilities.

With regard to metacognitive processes, the high and relatively high users and self-regulators all set proximal goals for themselves and appeared to plan for their studies. The low users and low self-regulators set distal or vague goals such as getting a diploma, being successful in life or planning to 'work harder'. The high and relatively high users of the web and self-regulators appeared to have better self-monitoring strategies in place. The low users and low self-regulators tended to express feelings of frustration or fear when asked to describe their thinking while busy with difficult tasks. The high and relatively high users tended to be able to describe what they found difficult, i.e. they know what it is that they do not know or find difficult. The high and relatively high self-regulators tended to measure themselves against some standard and tried to improve on their efforts, whereas the low self-regulators seemed to measure themselves in terms of whether they pass or not. In terms of self-reaction, the low self-regulators tended to come up with excuses for low

performance or lack of action. The high and relatively high self-regulators appeared to take appropriate action to correct behaviour.

In terms of resource management strategies, the high and relatively high self-regulators appeared to have better time management strategies in place and did not report falling behind in their studies. All students expressed a preference for working where it is quiet, but the low self-regulators appeared willing to sacrifice a quiet workplace for the availability of peers to help them.

Apart from self-regulation, factors that appear to be relevant to high use of the web to supplement and enhance formal course work and skills, are other uses of the web such as social networking and direct assessment. Four of the five low users of the web for self-study were also high users of the web for social networking. Only one of the relatively high users of the web reported high use of the web for social networking.

Another factor that appears to be relevant to the high use of the web for self-study is direct assessment. All five of the high and relatively high users of the web to supplement and enhance formal course work and skills reported using the web for their studies even when they do not have assignments and tests. All five of the low users appeared to only use the web academically when they have assignments and tests, or to use it minimally for self-study.

The only other factors investigated that could play a role appear to be students' attitude towards the web and ease of use. Five of the high and relatively high users reported that they are 'crazy about the web' while only two of the five low users reported feeling this way. All five of the high and relatively high users reported that they find information on the web very easily, easily, or that they manage when looking for information. Two of the five low users indicated that they ask others when they cannot find information, while another student stated that she has difficulty in finding information. A fourth low user indicated that he stops searching when he cannot find information, and that he does not like looking for information on the web because it is 'too big'.

Demographic factors such as age, schooling, years of experience, educational background of parents and family support for technology do not appear to play a role in the high use of the web to supplement and enhance formal course work and skills among this group of students. However, the students with *more* computer and web experience tended to be

*lower* users of the web for self-study. The role of gender could not be established. All students reported that their lecturers regularly encouraged them to use the web.

## Chapter 5

# Discussion

In this chapter, I will discuss the findings of the study in relation to the research questions and the literature review. Despite the finding that self-regulation was found to be the most important factor relevant to third-year multimedia students' use of the web to supplement and enhance formal course work and skills, other factors such as location of web access, the use of cell phones, years of experience, other web use patterns and the effect of assessment also warrant discussion.

However, first it is necessary to look at the findings that demographic factors such as age, school attended, educational background of parents, and parental support do not seem to play a role in these multimedia students' use of the web for self-study. Several studies mentioned in the literature found the contrary. In the case of the multimedia students it is, however, very likely that these demographic factors fade into the background because the students have chosen an IT-related course, which essentially compels them to use the web and technology differently from students in other undergraduate courses. The same argument can be applied to ease of use. Most of the students no longer have difficulty finding information on the web because they have become experienced web users due to their studies. The fact that seven of the 10 students indicated in their questionnaires that they 'are crazy about the web' could also be related to the fact that they have, in fact, chosen a course in which they learn how to help build the web. However, three of the low self-regulators said they use the web when they have to, or it is not a big part of their lives. This could relate less to how they feel about the web and more to how they view their studies, i.e. they see it as a means to an end or have an extrinsic goal orientation. This last point will be elaborated on further in the discussion on self-regulation.

One of the most important issues in terms of access and use is the location of students' access. Although not related to use by students exclusively, Hassani (2006:265) found that home access is a key factor associated with using the internet to promote individual wellbeing, but home access alone does not sufficiently explain how location of access matters. Individuals who have many connections – especially if those connections are high

speed, and offer privacy and freedom from felt or actual constraint – are most likely to take advantage of internet technology for personal benefit. This could be why some of the high users take advantage of the relatively good internet connection on campus rather than convincing their parents to get internet at home and having to compete with others at home for the use of this resource. Unfortunately, as could be seen in this study, some of the students use a substantial part of their access on campus for personal benefit instead of their studies.

Selwyn (2003a:8) makes a distinction between access to technology and ownership when mentioning that access at a public place and home access are not necessarily equitable. He points out that issues such as adequate access time per user, the quality of the technology, help desk facilities and the environment in which it is used, are all issues that might affect web access in public spaces. Although it can be argued that many of the multimedia students do not have a choice but to access the web in the lab because of financial circumstances, some of the factors mentioned by Selwyn could also explain why more students in the class do not get the web at home. It is not necessarily always a case of lacking material means, because some of the students, like Clyde, has his own car, yet no web connection at home. Multimedia students have their own labs, and it could mean that students experience some sense of ownership in terms of their access there. Students confirmed in the interviews that they usually do not have to compete for access to computers and the web in the lab. At home they might have to compete with family members. As expressed by some of the students in the interviews, the availability of help from classmates in the lab and the help of lab technicians, might also be a big reason why some students prefer to work there. Thandi said she would prefer working in her room but then she would not have the help of other students at hand. The fact that the multimedia students get sufficient web credits could also be a reason why many might not consider it necessary for their families to incur extra costs at home for web access.

The only student who has web access at home, David (RHU), still uses the web more in the lab than at home (9 –10 hours compared to 7 – 8 hours, respectively). This could relate to the fact that students often have time before or after classes, and they usually work in the lab during these times. Sipho who has a modem in his room on campus, did say, however, that he works more in the lab because his private access gets too expensive.

The relatively good access on campus is also seen as a reason why the multimedia students do not really see the need to use their cell phones extensively for their course, unlike the students studied by Czerniewicz, Williams and Brown (2009). As seen in the findings, the students interviewed make little use of their cell phones for their studies. In their study of online access at three South African universities, Czerniewicz et al. (2009:78-80) found that 40% of respondents said that they use their cell phones for study-related purposes. The majority of students who accessed the web off campus said they were doing so using their cell phones rather than through other means. Their study confirmed the general assumption that cell phone use is primarily social but they found it significant that students from different socio-economic backgrounds use their cell phones for academic purposes. Nearly 20% of these students reported that 40 – 80% of their cell phone use is for this purpose. In contrast, the students interviewed for this study made it clear in their questionnaires and in the interviews that their main use of their cell phones is for social purposes, and only three of the ten students had 'looking for information' as one of their three uses. All three students reported that this activity was only their third most important use.

The two high web users and high self-regulators basically confirmed that good access in the lab means that they do not really need to use their cell phones at home because they download whatever they need for their studies in the labs. This reminds one of Czerniewicz et al.'s (2009:86) description of students who 'circumvent the constraints imposed by structures' in terms of their lack of access. In contrast, three of the low self-regulators and users of the web for self-study lamented their lack of ICT access at home and felt that they would have worked harder if they had access. The fact that the high self-regulators found a way around their lack of access so that they could still achieve their study goals, once again illustrates the point that access alone or even lack of access, cannot explain why some students use technology more than others.

The finding regarding students' years of experience in terms of computer and web use are surprising, in that more experience does not mean higher use among the multimedia students – as the 'digital natives' argument implies – and as also found by other researchers mentioned below. Cyril, Vusi and Clyde have more than ten years of computer experience, yet only Cyril is a high web user. Thabo is the only student who had no computer experience prior to university, yet he is a higher web user than the low self-regulators and web users. All five low self-regulators have more than five years of web



experience. Yet, they are low users of the web to supplement and enhance formal course work and skills. In comparison, the two high self-regulators and web users for self-study, John and Cyril, only have 3 – 4 years of web experience.

This finding is also in contrast to studies by Selwyn (2008a) and Hassani (2006) which indicates that years of experience has an impact on students' use. It can be argued that the multimedia students had chosen to engage with technology when they decided to enrol for the course, and consequently, their years of experience no longer play a role in their studies at third year level. At the same time, however, the finding once again shows that other factors, such as the ability to self-regulate, need to be present to ensure that good access to technology leads to optimal use.

The low self-regulators' high use of the web for matters unrelated to their studies, such as social networking, is disconcerting, especially if it is taken into account that four of the five spend so little time on the web in total. This finding supports the argument that the low self-regulators use a 'course survival strategy' (Karasavvidis, 2008) and that their academic use of the web centered around use for assignments. In contrast, four of the high and relatively high users either do not use social networking at all or do so in a limited fashion. Four of the five low users of the web to supplement and enhance formal course work and skills were also high users of social networking, apart from other non-academic uses such as e-mail. Jones et al. (2009) found that 40% of the students at 40 American higher education institutions said they used the internet most often for social communication, and only 22% reported that they most often use the internet for work related to their studies. They also found that nearly all of the students spend at least one hour per day on the web and 72% reported spending less than that time on studying for classes. Selwyn (2008a:13) points to a study of Belgian students that showed that students' internet use often clashes with their academic progress, which led the Belgian researcher to believe that students' use or non-use of the internet for academic purposes was not always due to a disadvantage but more to matters of 'digital choice'. This argument could certainly apply to low self-regulators like Clyde, George and Vusi, who feel that they might have spend more time on their studies if they had the web at home. Yet Clyde and George spend little time on the web in the lab and a substantial part of this web use is for activities unrelated to their studies. Although they view themselves as being at a disadvantage in terms of lack of web access at home, they do not use the web optimally for

academic purposes when they have good access in the lab. They could very well be distracted by their social networking and social communication uses.

In his study of UK undergraduate internet use for academic purposes, Selwyn also found that students' use of the internet to find educational information was ranked lower than communicative and social software use. In his study conducted in 2006/2007 he found that significantly higher proportions of students reported frequent use of the internet for e-mail, chat rooms, blogging and other social networking activities rather than academic activities. Selwyn (2008a:16–17) found that academic-related information-seeking was an important but not a predominant part of the students' everyday engagement with the internet. Eighty percent of Selwyn's students indicated that they send or read e-mails all the time, 64% reported that they use internet news groups, chat forums and instant messaging all the time, 55% indicated that they engage in social networking activities all the time and only 50% reported looking for information about university studies or assignments all the time. As indicated in **Table 4.3**, the multimedia class as a whole, therefore, does not seem to act very differently from the students in Jones et al.'s (2009) study or in Selwyn's (2008a) study. Sixty-nine percent of the students in the class said they access social networking sites a few times a day, every day or almost every day, while 84% used their e-mail this frequently. In comparison only 48% of the class use the web this frequently for assignments. The fact that the multimedia students' use of the web is not very different from that of the American and British students across disciplines is very disconcerting, considering that they are studying an IT-related course for which they receive four times more web credits than other undergraduate students at the institution. Here Selwyn's argument for more discipline-specific studies comes to mind to address the 'barriers' that might underlie the differences in students' internet use, and which he suggests run deeper than 'physical or technical issues of resourcing and skill' (2008:19). Although he does not mention specific issues, the findings of this research indicate that one of these 'deeper running issues' could be a matter such as self-regulation.

Another factor found affecting students in this study's web use, is the matter of assessment. In the literature review, a number of studies were mentioned that indicate that students are more likely to engage in web-based or web-related activities for academic purposes, if assessment is directly connected to these uses (Cole, 2009; Karasavvidis, 2008; Warren, 2008; Kirkwood, 2007). The low self-regulators in this study were also

found to engage with the web academically mostly when they had assignments to do, hence their self-confessed low use of the web to supplement and enhance formal and assessed course work and skills.

This last point is also in line with the finding that the low web users' goal orientation is extrinsic, which now brings me to the main finding, i.e. that self-regulation is the most important factor relevant to third-year multimedia students' use of the web to supplement and enhance their formal course work and skills.

Before discussing the main findings in terms of self-regulation, it is necessary to look at the finding that there appears to be a correlation between the academic achievement of the students and their self-regulatory behaviour and web use. Although marks were one of the criteria used to select participants, I did not set out to find a correlation between academic achievement and web use. However, as the study progressed it became clear that the high and relatively high self-regulators and web users fell within the top 30% of the class in terms of marks and the low self-regulators and web users scored average to weak marks. Zimmerman (1990:7) points out that there is growing evidence that students' use of self-regulated learning strategies play an important role in academic achievement. He points to a study in which it was found that students in higher academic tracks reported significantly greater use of all self-regulated learning strategies than low achievers, except for self-evaluation. Students' achievement could be predicted with 93% accuracy using their weighted strategy totals across all learning contexts. According to Zimmerman (1990:9), an unexpected finding in the study was that students in the lower achievement tracks gave several common non-self-regulated responses with greater frequency than high achievers. For example, lower achievers would report that they just do what the teacher tells them to do, or they made simple 'will-power' statements such as 'I'll just work harder'. The low self-regulators in the present study also tended to make vague statements in terms of learning strategies while the high and relatively high self-regulators were able to describe in clear terms what they did not understand or how they, for instance, track their own functioning. The Zimmerman study found that less frequent mentioning of strategies by lower achieving students was not due to their lack of verbal expressiveness, but rather to their lack of self-regulatory initiative. The results of Zimmerman's study indicated students' use of self-regulated learning strategies made a distinctive contribution to their academic achievement apart from general ability.

Crucial to self-regulation is the motivational component, which includes goal orientation as set out in the literature review. Because the low self-regulators and web users for self-study have an extrinsic goal orientation, they see their studies as a means to an end, such as merely obtaining a qualification, being financially independent or getting approval from parents, teachers or other students. This is opposed to the high and relatively high users of the web for self-study who clearly have an intrinsic and mastery goal orientation and see their studies as an end in itself. Pintrich et al. (1991) point out that when a student has a mastery goal orientation, the student has a concern with learning and mastering tasks focusing on self-set standards and self-improvement. This was evident from the interviews of all the high or relatively high self-regulators and web users for self-study. As pointed out by the researchers, a relative ability orientation refers to a students' concern with their ability in comparison to other students, i.e. doing better than classmates.

As mentioned in the literature review, Pintrich et al. (1991:10) state that an extrinsic goal orientation can complement an intrinsic goal orientation. This seemed especially true in case of the two high users and high self-regulators, John and Cyril. Both mentioned that they compete with others on their level although it was also clear that they have mainly an intrinsic and mastery goal orientation. Pintrich (2004:395) quotes Wolters as saying that college students can intentionally try to evoke extrinsic goals such as getting good grades to help them maintain motivation. John, for instance, said that if there is nobody to compete with, he 'manifests' a rival by finding work on the web that he can beat. In their study on the influence of feedback and self-evaluative standards on students' self-regulation and mathematics performance, Labuhn, Zimmerman and Hasselhorn (2010:174) explored the influence of mastering learning standards (an intrinsic goal orientation) in contrast to social comparison standards (an extrinsic goal orientation). They point out that a certain degree of social comparison will always be present in a classroom context and that comparison is an almost inevitable element of social interaction. Therefore, students are aware of their classmates' performance levels and how well they perform compared with their peers. All of the students interviewed indicated that they are aware of how their classmates perform but, as indicated, not all of them felt that they were competing with their classmates. Labuhn et al. cite France-Kaatrude and Smith as saying that social comparison does not necessarily have negative effects and may even enhance task motivation. They also point out that other research indicates that social comparison might have negative effects especially for low-performing students.

The study cites Bandura and Jourden's finding that students who assumed that they are always performing worse than their classmates showed a decline in self-efficacy levels and performance (2010:177-178). This could indeed be the case in respect of Clyde's beliefs in his superior PHP skills and his lack of belief in his design skills. His confidence is boosted by the fact that he understands PHP much better than his classmates, but compared with most of the other students in the class he feels that he has no creativity to help him with his design work.

The fact that many of the students in the class, including students interviewed, show a lack of interest in, and low self-efficacy beliefs in terms of, PHP – could also be related to social comparison in the classroom. It almost seems as if students suffer a 'collective' lack of self-efficacy and do not feel pressured to increase their interest and skills level because almost everybody else in the class has difficulties with the subject. Here the two high self-regulators are once again an exception. Because of their high self-efficacy beliefs and other self-regulatory skills they are still competent at PHP programming, even though they confess to not having much of an interest in the topic.

As mentioned in the literature review, social cognitive theorists regard self-efficacy as a key component affecting self-regulated learning (Zimmerman, 1989:331). Students' self-efficacy affect two crucial aspects of the self-regulation cycle, namely, their use of learning strategies and self-monitoring. Citing several researchers, Zimmerman points out that students with high self-efficacy use better quality learning strategies and engage in more self-monitoring of their learning outcomes than those with low self-efficacy. Self-efficacy perceptions also have a positive impact on students' persistence with a task, choice of task, effective study activities, acquisition of skills and academic achievement. The students in the study who lack self-efficacy, also tended to rely heavily on help-seeking instead of trying to solve problems independently by, for instance, using the web. For example, Thandi and Mpumi's belief that they will always fail PHP sets off a chain of events. They do not persist in trying to apply their theoretical knowledge, turn to other students for help and lose the opportunity to develop crucial metacognitive and practical skills. The same happens to Clyde. He firmly believes that he lacks design and Flash skills, gets very easily frustrated, turns to help-seeking and, in the process, fails to develop the skills himself or to gain more confidence in his abilities.

In contrast, the high self-regulators and web users like John and Cyril try to go beyond what the assignment brief asks, i.e., they choose a more complicated task. Because they do not have more advanced students than themselves to ask for help, they persist when experiencing difficulties and turn to tutorials instead of quick help-seeking from other students. They develop more effective learning strategies, know that they are able to solve difficult problems, self-monitor when they are working and develop more advanced practical and self-regulatory skills. This, in turn, boosts their self-efficacy beliefs even further.

Compeau, Higgins and Huff (1999:146) also refer to this reciprocal relationship between self-efficacy and outcome expectations, and the way students interact with technology. Higher self-efficacy beliefs and positive outcome expectations in relation to the use of technology results in higher and more successful use of technology which, in turn, boosts self-efficacy and positive outcome expectations regarding the use of technology. Hill and Hannafin (1997:39) point out that web users with high self-efficacy tend to be more persistent in their searches and more confident in their ability to locate the information they are looking for. In the case of the high and relatively high self-regulators in this study, it therefore seems safe to argue that the results they achieve from their voluntary use of the web for self-study not only boost their self-efficacy beliefs but also serve as a trigger for continued engagement with the web in this way and, indeed, with more difficult tasks. The reverse could very well be true for the low self-regulators. Thandi, a low user, refers to really trying hard when it comes to PHP but expects her efforts to fail. Despite her efforts in this regard, her low self-efficacy beliefs in her ability to learn therefore does not lead to much since she expects to fail.

The finding that four of the five low self-regulators experience some level of anxiety about their studies also fits in with the above picture. In the literature review, Pintrich (1991:15) was quoted as saying that ‘cognitive concern and preoccupation with performance have been found to be one of the greatest sources of performance decrement’. It indeed seems as if the anxiety that the low self-regulators experience, coupled with their low self-efficacy beliefs, hold them back in terms of performance. They believe that they cannot understand or do the work, that their efforts will not really make a difference, fear that they will fail and knowingly or unknowingly put less effort into the particular subject or study topic. For example, Clyde believes that he has no design skills, therefore he does not really

try and relies on classmates for help, and in the process does not improve his design skills. He specifically refers to everybody throwing parts of an assignment together without one knowing what the other did.

Garcia and Pintrich (1991:2) found that intrinsic motivation could have a strong effect on self-efficacy and self-regulation. They see motivation as ‘triggering’ a process. ‘Students’ perceptions of value, importance and interest impact upon their use of learning strategies and their evaluations of competence and expectancies for success’ (1991:10). This process is also evident with the high and relatively high self-regulators in this study. Their intrinsic goal orientation and motivation for their studies indeed trigger their perceptions of value, importance and interest, and lead to their high web use, especially when encountering difficulties or when they want to do more than what is required for the course. This inevitably improves their competencies, leads to higher self-efficacy and expectancies for further success. However, it is also evident that their higher use of the web not only improves their learning strategies and competencies but triggers renewed interest, which leads to even higher motivation for their studies. This was clear in John and Sipho’s explanations of how they see work on the web that they want to equal or improve on.

From the above description it is clear how higher motivation – including self-efficacy – impacts on subsequent processes like the choice of learning strategies, evaluation and other metacognitive processes.

In a study on self-regulatory processes among students studying science, DiBenedetto and Zimmerman (2010:19) also found that on two measures of self-efficacy, i.e. self-efficacy for learning and for performance, low achievers overestimated or evaluated their competence in science the most. Average achievers displayed lower levels of overestimation and high achievers displayed a slight underestimation of self-efficacy. In this regard, George, who rated himself high in terms of confidence to handle difficult tasks, could very well overestimate his self-efficacy and therefore use less effective learning strategies. He does not think there is much to worry about and, therefore, puts in less effort, procrastinates and confesses to sometimes handing in assignments late.

On the other hand John, the top achiever in the class, rated his confidence fairly low. This could mean that his underestimation of his skills leads to more effort and more effective

learning strategies – such as problem-solving through the web – than an overconfident student like George.

Another important metacognitive strategy is goal-setting and planning. As mentioned in the literature review, Bandura and Schunk (1981) emphasise that goals must be explicit and not vague intentions. They point out that setting a goal in the distant future makes it easy to slacken efforts in the present. They also state that proximal goals ‘provide immediate incentives and guides for performance, whereas distal goals are too far removed in time to effectively mobilise effort or to direct what one does in the here and now’ (1981:587). For example, when the low self-regulators say that their goal is to get their national diploma, the goal is distal and is not likely to activate immediate behaviour. When the high self-regulators set a goal to work through a few tutorials on a particular day they have a proximal goal. The low self-regulators in the study all tended to have vague and distal goals such as obtaining their national diploma or not failing, and subsequently did not have a plan that they executed. On the other hand, the high and relatively high self-regulators had specific plans to fit in with their proximal goals. John already had a file of tutorials that he wanted to work through during the June holidays that had just started at the time of the interviews. David explained how he breaks assignments up in phases and does not stop working until he has completed a planned phase. Thabo, Sipho and Cyril could also describe how and when they would work on their portfolios during the holidays. All of the high and relatively high self-regulators also stated that they work through all their tutorials whereas the low self-regulators would keep tutorials until, or in case, they need them. Consistently working through tutorials is a normal part of the self-study activities of the high and relatively high self-regulators and web users, which means that their goals were proximal enough to lead to immediate action.

Zimmerman, Bandura and Martinez-Pons (1992) point out that goal-setting is also affected by students’ efficacy beliefs. ‘Perceived self-efficacy influences the level of goal challenge people set for themselves, the amount of effort they mobilise and their persistence in the face of difficulties’ (1992:664). The relationship between self-efficacy and goal-setting is once again reciprocal. They refer to studies indicating that to teach low-achieving students to set proximal goals for themselves increased their sense of cognitive efficacy, their academic performance and their intrinsic interest in a subject. As mentioned in the findings, it is disconcerting that some of the low self-regulators seem to rely heavily on



classmates when they encounter difficulties rather than mobilising more effort in trying to solve their own problems, such as using the web to find tutorials. However, when looking at their low levels of self-efficacy it is not surprising that they do not put in more effort but choose the easy way, i.e. to ask others rather than even try to solve the problem via the web. Again the argument applies that because they do not put in more effort and try to solve the problem themselves, they lose the opportunity to develop higher level cognitive skills and practical competencies. Their self-efficacy also remains low and they continue to set low or vague goals for themselves. Here Clyde's belief in his lack of design skills again comes to mind, as well as Thandi and Mpumi's beliefs in their inability to master PHP. Clyde, for instance, appears extremely passionate about PHP but he feels that he will 'get deeper' into it when he starts working. He therefore sets himself a distal goal even when he is passionate about a particular part of his studies.

Labuhn et al. (2010:174) point out that important to a student's self-regulation is metacognitive awareness of his or her own processes when engaging in a specific task. 'Self-regulated learners are aware of whether they do or do not know something'. Several of the low self-regulators were unable to explain what they found difficult about, for instance, PHP. Students were asked specifically to explain what they found difficult about a particular topic in their studies to assess whether they know what it is that they do not know or understand. If a student does not know what he or she does not understand, there is no starting point to tackle the problem. John and Cyril, the two high self-regulators, were for instance clear and precise about their understanding of PHP, and John specifically explained how he would work through a PHP task. The low self-regulators like Mpumi and Thandi just kept on saying, 'it's the practicals'. Low self-regulators such as Vusi and Clyde expressed self-defeating thoughts when asked what they do and think when they are busy with a challenging task. Instead of trying to identify their problem they would mention thoughts such as 'giving up' or asking somebody else to help them.

According to Labuhn et al. (2010), the metacognitive ability to judge what one knows or does not know, is closely related to 'calibration or calibration accuracy', which concerns the degree to which a student's judgement of his or capabilities represent their competence in reality. They cite Bandura as saying that "being able to make accurate judgements of one's capability is pivotal for successful academic achievement. Hence, students will only be able to self-regulate their learning effectively if they monitor and evaluate their

progress accurately and thus make adaptations that are based on a correct analysis of their performance” (2010:175). As mentioned with regard to the overestimation of competence, a low self-regulator like George does not seem to accurately judge his performance and therefore does not see the need to work harder or drastically improve his skills.

According to Zimmerman (2002:68), one form of self-judgement, self-evaluation, refers to a student's 'self-observed performances against some standard'. This could include the student's previous performance, a comparison with another person's performance or an absolute standard of performance. The high self-regulators in this study would regularly make statements indicating that they consistently try to improve on their efforts and performance, whereas the low self-regulators seem to stay in 'survival mode' in terms of completing assignments and passing. They seldom made reference to improving their skills but would rather refer to passing their assignments or make vague statements such as 'trying harder' or working harder. In contrast, the high self-regulators engage in continuous self-study when they do not have assignments, and try to excel and meet more than the minimum requirements for the course. They see the course as a starting point and feel driven to engage in learning over and above their class work, and measure their progress in terms of standards they set for themselves and what they see on the web. The low self-regulators would regard their passing of assignments or not failing as their only measurement of success.

An important point with regard to self-reflection is causal attribution in terms of defensive or adaptive reactions (Zimmerman, 2002:68). As could be seen from the literature, low self-regulators tend to blame factors outside themselves, such as a lecturer's teaching methods or too much work. The low self-regulators in the group tended to make excuses, such as not working as hard as they could because they do not have the web at home. In contrast, the high self-regulators came up with solutions to the problem, i.e. downloading what they need when they are in the lab so that they could work at home. The low self-regulators also tended to blame lecturers' teaching methods more frequently for lack of understanding. As mentioned above, when talking about procrastination the low self-regulators would explain that they work better when they do not start with assignments ahead of time and are working under pressure. On the other hand several of the high self-regulators said that they no longer procrastinate, indicating that they correct behaviour that is detrimental to their functioning.

Apart from motivational and metacognitive processes, resource management strategies such as help-seeking and management of time and environment are also crucial. With regard to the management of their study environment, Wolters points out that self-regulated students are effective at help-seeking, group management and other elements of collaboration. 'Essentially, because they are motivated and effective at managing their environment, self-regulated learners are able to work with others in the academic context in a way that will aid them in the achievement of their personal learning goals' (2010:9). High self-regulators such as John and Cyril described how they tackled group work in that they knew each others' strengths and weaknesses. On the other hand, a low self-regulator such as Clyde mentioned how his team would often 'throw things together'.

What Wolters and other researchers do not caution against, is an over-reliance by weaker students on social dimensions of learning or misconceptions about the aims of peer-learning and help-seeking. Newman (2002:132-135) points to the importance of adaptive help-seeking in self-regulated learning, or asking for help in order to learn independently, as opposed to help-seeking simply to obtain the correct answer. Where self-regulated learners are motivated by personal learning goals, they ask for hints on how to perform a task and feedback about the correctness of their work. Students with performance goal orientations are not necessarily interested in this kind of information. Here, Mpumi's description of how group members work together at one computer comes to mind. Typically, in this course, group members would each carry out a specific task and then combine their efforts.

In terms of time management, the low self-regulators made several statements indicating that they lack time management skills. George and Thandi even tried to justify procrastination by claiming that they work better under pressure. Clyde, for example, made regular references to getting 'stressed out' when time is limited and also gave that as reason as to why he asks somebody for help rather than searching on the web, because it 'can get too long'. This is a perfect example of where help-seeking is used for the wrong reasons. Nelson-Le Gall (1987:54) makes the point that for help-seeking to be classified as adaptive behaviour, the appropriateness of help-seeking for somebody having an 'assumed or known level of capacity for coping with the difficulty encountered must be determined'. Instead of persisting with a difficult task, and learning to solve his own problems through strategies such as web searching, Clyde lacks effort control, gets easily frustrated

and asks for help. In the process he foregoes the opportunity to develop more advanced self-regulatory skills especially in terms of critical thinking and metacognitive skills. He is also very blunt about his help-seeking strategies:

*I don't really like searching because especially when I search for code, I find it complicated because it's not always exactly the way you want it... I get frustrated and then I just ask someone. It's usually easier for me to ask somebody.*

In conclusion, it is important to make the point that self-regulation is not only an important process for multimedia students to ensure that they maximise their use of technology and achieve academically while studying. It is also a crucial skill for the field that they are entering. They will have to keep updating their skills as fast as technology is developing. Bandura points to the 'growing primacy of human agency in adaptation and change in the electronic era' (2002:1) and, with reference to educational self-development and self-renewal, says that 'educational systems must change their emphasis from mainly imparting knowledge, to teaching students how to educate themselves throughout their lifetime' (2002:4). The students in this study who are high and relatively high self-regulators and use the web at a high and relatively high rate for self-study, are already acting as agents in their own success in an era where constant 'adaptation and change' is required. Since the multimedia students are entering an IT-related field, their ability to adapt and change will be even more crucial than for professionals in other fields.

When considering the high and low self-regulators in this study and the picture that emerged from the interviews, it is useful to look in summary at Zimmerman's definition of self-regulated learners as metacognitively, motivationally and behaviourally active participants in their own learning.

Zimmerman cites a number of researchers in elaborating on these three processes of self-regulating learning (1990). Metacognitive processes include planning, setting goals, self-monitoring and self-evaluation throughout the acquisition process. 'These processes enable them to be self-aware, knowledgeable, and decisive in their approach to learning' (1990:4). The information from the interviews showed that the high self-regulators interviewed set proximal goals for themselves and part of their strategy is continuous self-study even when they did not have assignments. They were more able to explain how they planned for their studies, engaged in the self-monitoring of their functioning, and regularly

made statements indicating that they measure their performance against a certain standard and try to improve on their skills.

Zimmerman (1990) states that motivationally, high self-regulators have high self-efficacy and intrinsic task interest, and make self-attributions. They are self-starters and display 'extraordinary effort and persistence'. The high self-regulators in the study portrayed high self-efficacy and an intrinsic interest in their studies instead of merely aiming to pass their assignments or meet the requirements of the course. They can be described as self-starters and it is clear that they were more persistent in their efforts than the low self-regulators who would rather ask for help than find their own solutions to problems.

According to Zimmerman, behaviourally, self-regulators select, structure and create environments for optimal learning. These learners ask for advice, look for information and prefer places where they are most likely to learn (1990:6). Although the low self-regulators in the study would also ask for advice or help from classmates, they were less likely to look for information through web searching and working through tutorials. High self-regulators and relatively high self-regulators, such as John, Cyril, and David, preferred working at home so that they would not be distracted. In Sipho's case, he acquired a wireless modem to ensure access when he is not in the lab. The low self-regulators preferred working by themselves but instead of downloading resources so that they could work at home or in their rooms like the high self-regulators, they were willing to sacrifice a quiet environment in exchange for the availability of help from others.

Zimmerman also states that self-regulators 'self-instruct during acquisition and self-reinforce during performance enactments'. Self-regulators proactively look for opportunities to learn and self-initiate learning activities such as practice sessions (1990:6). All of the students who can be classified as high and relatively high self-regulators in this study, self-instructed on a regular basis through their web use and regularly referred to practising their skills. They do not merely focus on completing assignments for the course, but also create their own opportunities for learning.

## Conclusion

### *6.1 Final comments*

As mentioned in the rationale, the research for this study took place against the backdrop of Mark Prensky's claim that today's young people 'are very much aware that if they actually want to learn something the tools online are available for them to do it on their own'. Other researchers, such as Selwyn, argue that students are not necessarily inclined to use the internet in their studies. Brown and Czerniewicz also found that high access to technology does not necessarily mean high use. In the case of the students involved in this study, the latter findings ring more true. It was found that even among this group of IT students, who actively contribute towards the design and construction of the web, not all students necessarily use the web extensively for their studies just because it is available.

Interestingly enough, apart from one student, a high user and high self-regulator, the other students with most experience and exposure to the web were low users of the web. This implies that there are other factors apart from access that determine the extent to which students use the web. In this study, the most common factor among the high and relatively high users of the web to supplement and enhance formal course work and skills is self-regulation. As seen from the findings, motivation is not only a prerequisite for high web use to supplement and enhance formal course work and skills, but high web use also appears to trigger higher motivation for high self-regulators in this study.

As mentioned in the literature review, Bandura is of the opinion that the web provides vast opportunities for students to educate themselves. He states that the 'locus of initiative involves a major reorientation in students' conception of education in which they are agents of learning, not just recipients of information' (2002:4). This quotation seems especially true in the case of the high and relatively high users of the web in this study.

Contrary to what was found by some of the researchers mentioned in this research, it is also not necessarily demographic factors such as parents' educational background that determine whether students will use technology to the full extent. I argue that students can

and will use technology regardless of their background if they take on an agentic role and act as producers of their future, and not just as products of their circumstances as stated by Bandura (2001:1). Czerniewicz and Brown (2009:75) also refer to students exercising agency in constraining conditions. The majority of students in this study only had access to the web on campus, although some had plans in place to overcome this difficulty while others blamed their lack of use on a lack of access. A student who had no access or exposure to technology before he started his higher education studies, is one of the relatively high users and self-regulators, compared with a few of his classmates who had previous access and experience but are not using technology maximally.

To suggest that students' use of technology is simply dependent on a series of demographic or other factors of physical access, would be implying that students from disadvantaged backgrounds, who lacked access to technology in their early years, also lack crucial agentic characteristics that students from wealthier backgrounds are automatically assumed to have, such as the students in Prensky's world who grew up with technology. Contrary to Prensky's claims, those students in the study who had exposure to computers since childhood are not necessarily using it 'all the time'.

I am of the opinion that it is debilitating to the point of being dangerous to merely label students in fields such as information technology as disadvantaged because of lack of access, when a study such as this shows that there are students who make maximal use of opportunities and rise above limitations such as a lack of previous or current access. These high achieving students can be called 'digital agents' when taking into consideration that they do not necessarily qualify as 'digital natives' who grew up with technology or was surrounded by it. Neither can they rightfully be called 'digital immigrants' or even 'digital strangers' – for reasons of lack of previous or current access – because this would simply be too negative a term for people who so pro-actively eliminate or 'delete' whatever reasons or justifications for their 'expected' lack of performance, researchers come up with.

As I was reading for this research I could not help but come to the conclusion that research studies around the so-called digital divide focus either on those individuals who are 'disadvantaged' by factors such as lack of access or demographics, or on Prensky's 'digital natives', leaving individuals such as the high users and high achievers in this study on the periphery of research. There is a danger that these students could very well become

regarded as exceptions to the rule. Therefore, instead of research studies investigating their success, we keep on focusing on the 'rule', i.e. the so-called disadvantaged student for whom reasons and justification for failure are perpetually studied and provided in several countries, and not only in South Africa.

As mentioned in the introduction, many web designers and developers who currently work in industry are self-taught, and it can safely be assumed that many of them were not 'digital natives' who grew up with technology. If growing up with technology is a requirement for success with technology, how then does one explain the accomplishments of the generation who developed computers and computer technologies when they themselves did not have access to these technologies earlier on in their lives?

Lifelong learning is a crucial requirement for IT professionals and the web has become an important part in this learning process. Similarly, the high and relatively high users in this study are not merely satisfied with what is required to pass their course, but actively engage with technology to supplement and enhance their knowledge, or when they struggle with an aspect of the course. They therefore already have lifelong learning and problem-solving skills in place when they enter the workplace. This would imply that there should be a greater focus on problem-based learning where students learn to use the web to help them solve problems instead of following the easier route, which is to ask a classmate or lecturer. Help-seeking might not necessarily be a feasible option when they are working, and colleagues are too busy to help when the newcomer gets stuck. In the developing context, where there is a great emphasis on the development of entrepreneurial skills, and where IT professionals could work from home, it is especially necessary that students in this field learn from early on how to solve problems effectively on their own.

Regardless of the discipline, what seems evident from much of the research on access and use is that educators and educational institutions will have to start taking a long and hard look at students' non-academic use of the web and how that impacts on their academic use and performance. The low self-regulators and users of the web in this study spend little time on the web per week and admit that a substantial part of their use is for social networking, e-mail and other uses unrelated to their study. This was despite the fact that the multimedia students receive substantially more web credits for study specific purposes than do students in other disciplines. The findings of this study thus raise the question as to whether a digital divide exists in terms of technology access or whether it is not perhaps a



problem of learning processes such as self-regulation. If self-regulation is one of the crucial processes needed for optimal use of technology, it then also stands to reason whether students really choose to not use technology, as suggested by Selwyn.

A digital divide might be the issue in terms of who has access to technology and who does not, but once all have access the question needs to be answered as to why some previously disadvantaged students use technology such as the web and others do not. It is not a matter of disadvantage and also not of digital choice. To think that technology will transform education and that students will automatically embrace it for learning en masse is a fallacy. Students are students and what was true a thousand years ago is still true today. Some are more motivated to learn and have the skills, such as self-regulatory skills, and others are not motivated to learn.

As mentioned, I would like to suggest that it is self-defeating in the South African educational and social context to keep on focusing on the negatives that keep students behind instead of studying in-depth those individuals who defy the so-called odds and become producers of their own success instead of remaining products of their disadvantaged backgrounds, especially in fields such as technology. In the South African social and educational context, but also in other parts of the world, it is easy to forget that technology develops so fast that we are all at risk of becoming estranged from it unless we make a concerted and continuous effort to keep up with ever-faster technological developments. Taking into consideration the speed of technological development, there is no reason why students with a previous lack of access to technology cannot utilise and maximise technology at the same level as so-called digital natives. To suggest otherwise does not only imply that these students lack agency but also disempowers a generation of young people who did not grow up with technology and who are made to believe that they are at a disadvantage through continuous debilitating messages from teachers, politicians and researchers alike. As Bandura points out, 'the core features of agency enable people to play a part in their self-development, adaptation and self-renewal with changing times' (2001: 1–2).

It would be easy for us to lose sight of the fact that Clyde and Vusi, two low users, went to well-resourced former Model C schools and for us to look for reasons, such as their lack of web access at home, to explain their low use of the web. It could also be argued in Clyde's case that the breadwinners' educational background is a hampering factor in his utilisation

of the web, but in Vusi's case, that factor is absent and his background seems ideal in terms of the literature reviewed. When looking at Thabo's, however, all of the negative factors that would classify him as a 'digital stranger' and disadvantaged student are present. He did not have access to computers or the web until he entered higher education, he did not have parental support during his school or higher education studies, does not have access to a Wap-phone and the main 'breadwinner' in the family is a pensioner. Yet, Thabo, spends the second most time on the web and estimates that up to half of his web use is spent on study 'not for assignments'. It should also not be forgotten that the two high users in this study do not have access to the web at home, yet they are two of the three top achievers in the class, compared with three students who have web access at home but who do not achieve at the same level.

In conclusion, it is my opinion that when looking at technology in education the time has come to move 'digital agents' firmly into the spotlight they deserve. What they do needs to be studied and the positive lessons drawn from this study should be implemented. The focus, thus, should not be on students who have come to believe that they are unable to achieve because they are products of their background. We cannot continue to study what holds students back rather than what propels others forward. In this regard, processes such as self-regulation with its strong motivational component should be considered. But again, care should be taken not to make self-regulation, motivation and self-efficacy, goal orientation, planning, the setting of goals, self-monitoring and self-judgement dependent on students' social background. From a social cognitive perspective of self-regulation, social factors can indeed affect the self-regulative system. However, as stated by Bandura (1991), human behaviour is extensively motivated and regulated by the ongoing exercise of self-influence. It is therefore imperative that society, including educators, do not lose sight of the 'self' and the power of human agency in dealing with students. From this agentic perspective 'the capacity to exercise control over the nature and quality of one's life is the essence of humanness' (1991:248), and thought processes such as self-regulation should be fostered and not regarded as exceptions that apply to only some individuals. By actively teaching these processes, especially in relation to the educational use of technology such as the web, more students can become agents of their own future, instead of merely being social networkers where the emphasis is seemingly for students, merely on socialising.

## ***6.2 Limitations of this study***

The biggest limitation of the study is that the findings cannot be generalised to a wider group. Several measures would have to be used to determine self-regulation among a larger group of students over a few years. The use of self-reporting measures is not ideal. As pointed out by Greene, Moos, Azevedo and Winters (2008:1080), self-reporting measures are often inaccurate and students' use of self-regulation, for instance, should be monitored during actual learning tasks.

Although it was foreseen that the survey questionnaire could be problematic, it was still disappointing that so little information about self-regulation could be extracted from the questionnaire. Students were able to judge the desirability of answers to questions on self-regulation and therefore this section of the questionnaire could not be used. However, from the start, the intention was that the interviews should form the main method of this study and therefore students could be questioned in-depth about their use of the web and their self-regulatory skills.

## ***6.3 Recommendations for further research***

It is recommended that further research should be done about the impact of web use for self-study on students' academic achievement, experiential learning period and their performance in the workplace. Although it has been established in this study that there is a link between web use and self-regulation among multimedia students, it is worthwhile to look at the relationship between web use and academic achievement. It would also be useful to study how students (whom I would like to refer to as 'digital agents') perform in the workplace in comparison to so-called 'digital natives'. From my experience with the placement of multimedia students in the workplace, there are indications that these so-called previously disadvantaged students who optimally use technology are anything but disadvantaged in the workplace and can compete with students from 'elite' design schools and traditional universities.

Action research on instruction in self-regulation could be beneficial especially in view of the opinion I have expressed above that research in educational technology should start

moving away from the reasons why students are not able to use technology optimally. Rather it should start focusing on the success stories such as the high users and achievers in this dissertation who are also high self-regulators. The need for self-regulation and life long learning skills in the workplace, but especially in the IT field that develops at such a rapid pace, necessitates a strong emphasis on this kind of behaviour while students are still engaged with their studies. As Zimmerman and Labuhn point out, self-regulation can be taught to students, and merely making students aware of self-regulatory processes can already improve these processes (2010).

There is also not much research on how web designers and developers use the web to teach themselves and keep up to date in the workplace. Seeing that lifelong learning is a given for IT professionals, it is imperative that more research be done on how this learning takes place in order to prepare students better for the learning that needs to continue in careers in the IT field.

It might also be useful to determine why so many students in the multimedia class struggle with PHP and why they seem to have a mental block for this topic despite the fact that the students in this study repeatedly and spontaneously mentioned the dedication of their lecturer in this subject. Such research could especially be beneficial when conducted in conjunction with research on self-efficacy. Closely linked to this matter is the impact of opportunistic programming on students' skills level when they enter the workplace, and this is also an area that needs exploration, even though this is a commonly used practice among experienced web developers.

An issue on which little research could be found, especially in the South African context, is the detrimental effects of group work on the skills set and skill level of students. The need for such research is crucial in the outcomes-based context where continued evaluation and group work play a big role. A few students in this study referred to how group work is thrown together. This could mean that a predominantly web design-oriented multimedia student relies on group members to do development or programming and subsequently qualifies with little development or programming skills. Although particular care is taken in this particular programme to minimise such effects, students by their own account feel that it is possible to do very little of one or the other in a group project. This is by no means a phenomenon applicable to only one or two fields, and my own experience with several other disciplines have shown similar concerns expressed by students.

More research is needed on the impact of social communication use of the web by students, and in particular how social networking robs students of time and resources that could have been spent on academic web use. The impact of social networking time on students' academic performance should also be investigated. There appears to be an ever-growing number of studies on the affordances of Web 2.0 technologies such as social networking, yet research on the negative effects of social networking on the studies of students seem to be lacking. When looking at the studies in this dissertation, as well as the web use patterns of the multimedia student class, it is evident that students spend substantial time on, for example, Facebook, and this could very well have a detrimental effect on their academic use of the web.

Research is also necessary on how this ever-growing phenomenon affects productivity and performance in the workplace, as well as its impact on the affordances of the web for lifelong learning. Self-regulation seems particularly applicable to this particular topic to ensure that we keep on consuming technology in a meaningful way and to prevent us from being consumed by technology. As Bandura points out 'self-regulatory systems lie at the very heart of causal processes. They not only mediate the effects of most external influences, but provide the very basis for purposeful action' (1991:248).

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# **List of Appendices**

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## Examining 3<sup>rd</sup> year Multimedia students' voluntary use of the WWW

Please think carefully about each question and answer it as honestly and accurately as possible. There are no right or wrong answers. Circle one option, unless you are asked to circle more than one. Where necessary, please write down your answer.

### A. Your access to computers and the WWW

A1. Did you have access to a computer at school?

① At primary school

② At secondary school

③ At primary and secondary school

④ I only started using a computer when I started my studies

A2. For how long have you used a computer?

① Less than 3 years

② 3-4 years

③ 4-5 years

④ 5-6 years

⑤ 6-7 years

⑥ 7-8 years

⑦ 8-9 years

⑧ 9-10 years

⑨ More than 10 years

A3. For how long have you used the world wide web (WWW)?

① Less than 3 years

② 3-4 years

③ 4-5 years

④ 5-6 years

⑤ 6-7 years

⑥ 7-8 years

⑦ 8-9 years

⑧ 9-10 years

⑨ More than 10 years

A4. Do you have access to any of the following outside of the lab, e.g. in your room, at home, internet café,

① PC

② Laptop

③ I don't have access to a computer when I'm not in the lab

A5. Where do you access the **WWW** if you are not in the lab? Circle more than one if applicable.

① In res

② At home

③ Internet cafe

④ Wap-enabled cell phone

⑤ At a friend's house

⑥ At a family members' house

⑦ I don't have access to the WWW outside of the lab

⑧ Other (please write).....

A6. If you have access to the WWW when you are not in the lab, is it through:

① Dial-up

② Broadband (ADSL)

③ Cell phone

④ Wireless

⑤ Other (please write) .....

A7. How do you access the WWW most of the time?

① At home

② Via my cell phone

③ At an internet café

④ In the lab

⑤ Other (please write) .....

- A8. How often do you have web credits left on your **student account**?
- ①Never                      ②Almost never                      ③Every month                      ④A few months per year                      ⑤I don't know
- 
- A9. How often do you **buy** extra credit for your **student account**?
- ①Never                      ②Almost never                      ③Once a month                      ④More than once a month
- ⑤A few times a year
- 
- A10. Do you have a WAP-enabled cell phone?
- ①Yes                      ②No
- 
- A11. If you have a WAP-enabled cell phone, for what do you mainly use it? Circle the items applicable to you.
- ①Calls                      ②SMS or IM                      ③Social networking, e.g. Facebook, Twitter, MySpace
- ④Music                      ⑤ Looking for general information, like news, sports, celebrity gossip
- ⑥ Looking for information to help me with assignments                      ⑦Looking for general multimedia information
- ⑧Other (please write).....
- .....
- 
- A12. Please write down the order in which you use the items you circled above. For example, if your main use is for SMS and then for music, write down: 1. SMS 2. Music . **But please list only the activities for which you actually use your phone.**
1.                      2.                      3.                      4.                      5,
6.                      7.
- 
- A13. **IN THE LAB** : How many hours do you spend on the WWW?
- ①1-2 hours per week                      ②3-4 hours per week                      ③5-6 hours per week
- ④7-8 hours per week                      ⑤ 9-10 hours per week
- ± More than 10 hours per week (please specify how many hours) .....
- 
- A14. **WHEN YOU ARE NOT IN THE LAB**: How many hours do you spend on the WWW?
- ①1-2 hours per week                      ②3-4 hours per week                      ③5-6 hours per week
- ④7-8 hours per week                      ⑤9-10 hours per week
- ⑥More than 10 hours per week (please specify how many hours) .....
- 
- A15. Which statement best describes you:
- ①I use the WWW when I have to                      ②I'm crazy about the WWW                      ③I can live without the WWW
- ④ I use the WWW, but it's not a big part of my life ⑤I don't like using the WWW
-

A16. When classes are over:

① I go to my residence room

② I go home

③ I go to the lab

④ I go to my part-time job

⑤ I go to sport/other activities

⑥ Other (please write) .....

A17. What do you like doing in your spare time? You may mention absolutely anything.

## B. Your general use of the WWW

B1. How often do you use the WWW for the following, regardless of whether you do it through your cell phone, PC or laptop. Please tick the box corresponding with the activity.

Activity	A few times a day	Every day/ Almost every day	A few times a week	Once a week	Twice a month	Less than once a month	Never/Almo st never
<b>EXAMPLE:</b> <b>Look for info about Lions.</b>						✓	
Social networking (Facebook, Twitter etc)							
Logging onto the WWW to access my e-mail account							
Music							
Information on the latest gadgets, including prices etc.							
Sports information							
Information to help me understand class work							
Information about the weather							
The latest entertainment news							
New technological trends							
Information to help me with assignments							
Online newspapers							
Search for inspiration for the multimedia course							
Online magazines							
The latest fashions							
Information to teach me new multimedia skills							
Medical information							
Games							
Other (please specify):							

Please circle the option that is most true of you in the following statements or write down an answer where required.

B2. How easy or hard is it for you to find information on the WWW?

- ① It is very hard for me      ② It's hard      ③ I manage      ④ It's easy for me  
⑤ It's very easy for me to find info

B3. If I can't find information on the WWW **immediately**

- ① I ask somebody to help me      ② I stop searching      ③ I try for a while but then stop searching  
④ I keep on trying      ⑤ I don't stop until I find the info

B4. How often do you look for information on new technological trends?

- ① Never      ② Almost never      ③ Sometimes      ④ Regularly  
⑤ Very regularly

B5. If you visit websites to keep up with the latest technological trends, please write down the name of one or more of these websites.

B6. I prefer using the WWW instead of going to the library when I do assignments.

- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know

B7. I **don't** like looking for information on the WWW because there is too much useless information.

- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know

B8. How often do you look for information that can help you with your studies **when you don't have assignments to do**.

- ① Never      ② Almost never      ③ Sometimes      ④ Regularly      ⑤ Very regularly

B9. If I don't know how to do something, I look for **tutorials** on the WWW.

- ① Never      ② Almost never      ③ Sometimes      ④ Regularly      ⑤ Very regularly

B10. If you look for **tutorials** on the web, please write down the name of one or more websites where you get tutorials from.

B11. I prefer using the WWW for things that are **not** related to my studies, e.g. Facebook or other social networking sites, news, celebrity gossip, music or videos to download, the prices of laptops, cell phones and iPod's.

- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know

B12.	I think it is essential to look for information on the WWW if I want to pass the multimedia course.				
	①Strongly disagree	②Disagree	③Agree	④Strongly agree	⑤I don't know
B13.	How often do you read <b>discussion forums</b> on the WWW to see what sort of questions other people ask?				
	①Never	②Almost never	③Sometimes	④Regularly	⑤Very regularly
B14.	If you read discussion forums on the WWW can you name one or two of the websites where you read forum discussions?				
B15.	I have posted a question on a web forum.				
	①Never	②Almost never	③Sometimes	④Regularly	⑤Very regularly
B16.	I <b>don't</b> access the WWW when I don't have to.				
	①Strongly disagree	②Disagree	③Agree	④Strongly agree	⑤I don't know
B17.	I <b>only</b> look for information on the WWW when I have to do assignments.				
	①Strongly disagree	②Disagree	③Agree	④Strongly agree	⑤I don't know
B18.	If I don't understand something in class, I google it.				
	①Strongly disagree	②Disagree	③Agree	④Strongly agree	⑤I don't know
B19.	My lecturers encourage me to use the WWW.				
	①Never	②Almost never	③Sometimes	④Regularly	⑤Very regularly
B20.	When I find interesting articles on web design/development/programming I e-mail it to my friends or classmates.				
	①Never	②Almost never	③Sometimes	④Regularly	⑤Very regularly
B21.	I prefer using a textbook or printed handouts, rather than articles on the WWW.				
	①Strongly disagree	②Disagree	③Agree	④Strongly agree	⑤I don't know
B22.	If I hear of a new technological trend or application I look for more information on the WWW.				
	①Strongly disagree	②Disagree	③Agree	④Strongly agree	⑤I don't know
B23.	My lecturers regularly refer me to websites on the WWW as part of the multimedia course.				
	①Strongly disagree	②Disagree	③Agree	④Strongly agree	⑤I don't know
B24.	When I want to google a problem I encounter in my course, I'm not always sure what it is that I need to look for.				
	①Strongly disagree	②Disagree	③Agree	④Strongly agree	⑤I don't know

### C. How you view the Multimedia course

C1. Why did you decide to study multimedia?

---

C2. Would you describe your feelings towards the course as mostly negative or mostly positive or in-between? Please explain your answer.

---

C3. I struggle to see connections between the different aspects of the multimedia course

① Strongly disagree

② Disagree

③ Agree

④ Strongly agree

⑤ I don't know

---

C4. I only study the easy parts of the multimedia course.

① Strongly disagree

② Disagree

③ Agree

④ Strongly agree

⑤ I don't know

---

C5. Which aspect of your course do you like the most and why?

---

C6. Which aspect of your course do you like the least and why?

---

- C7. It is important for me to try and get better marks for the multimedia course than most of my class mates.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- C8. I **don't read** up on applications, technologies and scripting languages that are not part of the multimedia course because it is not a requirement for my course.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- C9. If I don't understand everything in the multimedia course, it is because I don't try hard enough.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- C10. I am confident of my abilities when it comes to the multimedia course.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- C11. I find it hard to keep up with the multimedia course.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- C12. Which aspect of your course do you find the **easiest**? Please give reasons for your answer.
- 
- C13. Which aspect of your course do you find the most **difficult**. Please give reasons for your answer.
- 
- C14. All I need to do is pass the multimedia course. It is not important to understand everything.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- C15. I am sure that I can understand the most difficult aspects of the multimedia course.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- C16. The most important thing for me in the multimedia course is to get good marks.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
-

C17. If I don't like an aspect of the multimedia course, I don't spend much time on it.

① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know

---

C18. I regard the multimedia course as a starting point and try to develop my own ideas about what we learn.

① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know

---

C19. Have you taught yourself any multimedia-related skills that are not part of the course? E.g. programming or scripting languages, applications, etc. Please give details.

---

C20. What do you want to do when you are done with your studies?

---

## D. How you approach your studies

D1. I make sure that I can practically apply what I read or study or hear in class.

① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know

---

D2. How often do you practise to do the things that you find difficult?

① Never      ② Almost never      ③ Sometimes      ④ Regularly      ⑤ Very regularly

---

D3. When I have to do web development or programming, I know what it is that I have to do **but I cannot explain it in words.**

① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know

---

D4. When I get stuck with an assignment, I look for possible solutions on the WWW.

① Never      ② Hardly ever      ③ Sometimes      ④ Regularly      ⑤ All the time

---

D5. I am worried about failing when I have to do assignments.

① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know

---

D6. After class or while studying, I make summaries of the work or make notes of the most important points.

① Never      ② Almost never      ③ Sometimes      ④ Regularly      ⑤ Very regularly

---

D7. I often question what I have heard in class or what I've studied in my course.

① Never      ② Almost never      ③ Sometimes      ④ Regularly      ⑤ Very regularly

---



- D8. When I have to do an assignment, I draw diagrams or sketches to help me plan my assignment.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- D9. It is hard for me to explain what it is that I don't understand in the multimedia course.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- D10. If I am confused about something in the multimedia course, I ask myself questions to help me figure out what it is that I do not understand.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- D11. I set goals for myself when it comes to my studies.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- D12. When I read course material, I ask myself what I am supposed to learn from it.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 

## E. How you solve problems

- E1. If I encounter problems when I'm **coding**, I look for information on the WWW that can help me with my problem.
- ① Never      ② Hardly ever      ③ Sometimes      ④ Regularly      ⑤ Very regularly
- 
- E2. I ask one of my classmates to help me when I struggle to do something.
- ① Never      ② Hardly ever      ③ Sometimes      ④ Regularly      ⑤ Very regularly
- 
- E3. When I struggle with an aspect of the course, I work through it step-by-step even if it takes me a long time.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- E4. I copy code from the WWW if I don't know how to write it myself.
- ① Never      ② Hardly ever      ③ Sometimes      ④ Regularly      ⑤ Very regularly
- 
- E5. Even if I know how to write the code, I still copy it from the WWW because it saves time.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- E6. When the code I've copied from the WWW is not working, I find it difficult to trace the problem.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know
- 
- E7. Which is your favourite website or websites to look for code to copy?
- 
- E8. When I have to do an assignment, I keep on trying to solve problems until I get it right.
- ① Strongly disagree      ② Disagree      ③ Agree      ④ Strongly agree      ⑤ I don't know

---

E9. When I don't understand something in class, I make sure that I find out afterwards what I don't understand.

①Never                      ②Hardly ever                      ③Sometimes                      ④Regularly                      ⑤Very regularly

---

E10. How often do you ask one of your lecturers to help you when you don't understand an aspect of your studies.

①Never                      ②Hardly ever                      ③Sometimes                      ④Regularly                      ⑤Very regularly

---

This section asks for information about your background. Like the rest of the survey, all information will be kept strictly confidential.

## F. Demographic Information

F1. What is your gender?

①Male                      ②Female

---

F2. What is your race?

①Black                      ②Coloured                      ③White                      ④Indian

---

F3. How old are you?

---

F4. Where did you go to school?

①Private school                      ②Traditionally coloured school                      ③Traditionally black school

④Traditionally white school                      ⑤Traditionally Indian school                      ⑥Other (foreign students)

---

F5. Where was your secondary school situated?

①City                      ②Big town                      ③Small town

④Village                      ⑤Farm school

---

F6. What is your nationality?

①South African                      ②SADC                      ③Other African                      ④International

---

F7. What is the occupation of the main breadwinner at home (mother or father)?

---

F8. What is the highest qualification of your mother or father?

①Less than Std 6 (Grade 8)                      ②Std 6 (Grade 8)                      ③Std 8 (Grade 10)                      ④Matric (Grade 12)

⑤Certificate                      ⑥National Diploma                      ⑦Bachelors Degree

⑧Postgraduate (Honours, Masters, Doctorate)

⑨Other (please write).....

---

F9. Are you the first person in your household to go to university?

① Yes

② No

---

**Thank you very much for participating in this survey!**

You may write your name on the questionnaire or you may stay anonymous. If you choose to give your name, it will under no circumstances be mentioned in the study or to any other people, including lecturers.

Name (voluntary) :

.....

---

### **VOLUNTEERS FOR FOLLOW-UP INTERVIEWS**

The researcher would also like to ask for volunteers for face-to-face interviews. This information will be used in the study but at no stage will your name be mentioned. Instead, a fake name (pseudonym) will be used for the purposes of the study.

I would like to volunteer for a possible face-to-face interview ☐

Name: .....

Cell phone number: .....

Landline if you have one: .....

E-mail: .....

## Appendix 2

### Guidelines for Interview Questions – June 2010

1. If you had access to a computer during your school years, was this computer at school or at home?
2. Do you have a laptop or PC at home – is it your own or do you have to share it?
3. Do you have the web at home? Do you feel your web use would have been different if you had the web at home? Or would it basically be the same?
4. How would you divide your web use between lab and outside proportionally?
5. Looking for info on your cell – how often is it and is it just to quickly check something or to read up on multimedia topics for instance?
6. When you're in the lab, do you mainly work on assignments or class work or to read e-mail, or check Facebook etc?
7. How would you divide your time between the following?
  - Facebook
  - E-mail
  - Looking for information that's not related to your studies (sports, celebrity news etc)
  - Downloading brushes
  - Looking for code
  - Looking for templates
  - Looking for material that can help you with your studies.
  - How much of your time is spend in self-study, i.e. not for assignments?
8. Do you think you really need to do lots of web searches if you're struggling with something, or is it possible to do all your work with what you learn in class and with textbooks and help from classmates or lecturers.
9. What kind of searches do you need to do for assignments?
10. For which subject do you do the most web searches?
11. Do you sometimes or often find yourself just surfing, reading a bit here and a bit there, or do you just stick to the one thing that you are looking for?
12. If you only had half or a quarter of the internet credits you get, do you think you would still be able to pass the course?
13. If you really have to make an honest assessment, how often do you spend time learning from the web, without it having to be for an assignment?
14. Do you download tutorials? And how often do you work through those tutorials or do they just basically stay there in case you need them?
15. Do you get time to research things that you struggle with or do you find that you are so busy with assignments and your life, that you don't really get time to work on things that you struggle with?

16. How often do you just sit and just do work for yourself – to figure something out or to practice something that you find hard? Or to build your own websites?
17. Do you prefer using the web for other things or for studies? If you have to use one sentence to describe your feelings about the usefulness of the web for you what would that be?

### **Self-regulation**

18. How do you tackle your studies? Do you have a specific strategy?
19. If you struggle with something, what do you do?
20. What do you do when you did bad in a test or an assignment?
21. If you think back to your first and second year have you been following the same recipe that works for you or has your work and study methods changed?
22. Generally, do you feel that you are in control your studies or that your assignments and briefs and other requirements control how you work?
23. Is it difficult for you to get started on assignments? Do you have to negotiate with yourself and postpone and tell yourself you first have to do other things?
24. Are you ever done with your assignments before the time, or do you find that you mostly just make it and sometimes have to ask for extensions?
25. Do you think a lot about your studies, like when you're on the train or in the car or doing other things? What is it that you think about at those times?
26. Think of three difficult things for you in the multimedia course?
27. What is it that you find difficult about it?
28. How do you deal with a tutorial?
29. When you're working through a tutorial do you do cross-checks with other material or do you understand everything immediately?
30. Do you often have to sit down and organise your thoughts about a particular task or assignment that you have to do?
31. Do you use outlines, or diagrams or make summaries?
32. Do you take notes in class? If you do, what do you do with the notes?
33. While you're sitting in class, do you often see connections between things and start wondering about it or do you just focus on what the lecturer is saying?
34. Do you memorise things or do you find it's not necessary?
35. Do you have a notebook or a file that you keep to write down things that are important to you or do you just keep it in your head? Or go and look for it on the web when you need it?

36. When you're busy with something challenging, what kind of thoughts go through your head when you are working?
37. Are you generally satisfied when you're done with an assignment or do you think about it again afterwards and how you could do things differently?
38. How often do you go back and change things? Or do you mostly feel it's not necessary?
39. Do you generally feel that you can see all the connections between the different aspects of the course, or do you sometimes feel that things are just not coming together in your head?
40. How often do you walk out of the class thinking that you didn't understand everything very well?
41. What do you do then?
42. Do you often find that you're not agreeing with what the lecturers are saying in class? You have your own ideas?
43. If you're having a discussion do you often disagree with your classmates and have your own views on things?
44. Do you guys talk about the work that you're dealing with or not really?
45. When you're doing group work, do you have a lot of discussions and debate or does everybody just do what's expected of them?
46. Do you have people that you speak to when you don't understand something or you're wondering about something?
47. How do you see the course, is it just a starting point for you or do you expect it to be more intense?
48. Do you generally feel that you are in charge of your marks or do you think that you can work as hard as you want but you won't get good marks?
49. Is it important for you to be able to do everything and understand everything or do you think there are a lot of things that are not really useful for you?
50. Do you have a plan that you work according to or do your assignments and class work determine how you work?
51. What sort of goals do you have for your studies, say over the next three months?
52. What are you planning to do in the holidays?
53. When do you mostly work on your studies?
54. Do you prefer to work by yourself at home or do you prefer working in the lab?
55. Do you listen to music or use earphones when you're working in the lab or at home?
56. Do you think you have enough time for your studies or are there lots of other things that require your attention and time and that distracts you?
57. Do you sometimes fall behind with your work and then find that you have to play catch-up?

58. Are you generally happy with how you work on your studies or do you feel that you would have liked to work more?
59. Is the pace of your studies too slow or too fast for you?
60. Do you sometimes feel bored in class or loose interest because the work is too easy or too difficult?
61. How do you see your course? Do you feel that there should be much more work and assignments or more classes?
62. How do you see the multimedia course as a tertiary education course? Do you generally feel that lecturers should put in more effort or do you think you should put in a lot more effort?
63. Are the things that you learn in the course enough for you?
64. What motivates you? / What is your main driving force in your studies?
65. Is it important for you to do better than your class mates?/ Are you very competitive when it comes to your work?
66. How do you feel and what do you do when you get worse marks than you thought you should?
67. Do you want your parents to put more or less pressure on you to perform or does it not matter to you?
68. When you have a lot of work to do, do you feel challenged or do you feel that you feel that you just want to get it over and done with?
69. When you're working on an assignment is it your marks that you think about or do you think about what kind of work opportunities that task will give you?
70. Are you generally confident about difficult things or does it work up a lot of anxiety for you?
71. If you have to do an assignment do you worry about it and get scared that it will be difficult or that you will struggle?
72. Do you generally feel comfortable about your studies or do you have that nagging feeling that there are too many things that you don't understand the way you want to?
73. If you have to rate your confidence in your abilities, where would you put yourself on a scale from 1 to 10?
74. What do you think your marks are going to be like at the end of the year when you're done with everything? Average, good, low?
75. Are you looking forward to start working or does the thought make you a bit anxious?

## Appendix 3

### Basic analyses of student questionnaires and interviews

#### John

John is a 20-year old coloured male who attended a former HoR or traditionally coloured school. The main breadwinner in the family is an educator and has a bachelor's degree.

John has used a computer for 5-6 years and the web for 3-4 years. During secondary school, he had access to a computer at school and privately through extended family members. He now has his own PC at home. He does not have access to the web at home but occasionally uses the web at the homes of friends and through his cell phone.

He reports using the web for 14 hours per week in the lab under normal circumstances and spends extra time on the web when he works on assignments. He also spends an additional 2-4 hours per week on the web at a friend's house. John reports going to the lab when classes are over.

In order of importance, his main use of his Wap-enabled cell phone is for calls, SMSs, music, the internet, data transfers such as photos and MXit. He reports that 10% of his cell phone use is for web access. He describes himself as "crazy about the WWW".

John reports that 35% of his web time is for assignments and work that he is obliged to do for the course and 65% is for additional learning, i.e. self study to supplement and enhance formal course work and skills.

He finds Facebook "completely irrelevant" and checks his e-mail when he arrives in the lab and before he leaves but says he spends minimal time on e-mail.

The student has a strategy in place to overcome the fact that he does not have access to the web at home. When asked about the 10% use of his cell phone for internet access, his reply was that "most of the time at home I don't normally have to go onto the internet. There's no need to do it because when I'm at the lab I make sure I get everything I need so that I can apply it at home. ... I don't like going on the internet through my cell phone."

He describes himself as crazy about the web and finds it easy to get information on the web. If he can't find information, he keeps on trying.

#### Motivational processes

##### Goal orientation

He has an intrinsic goal orientation and states that he would rather download pdf's to teach himself how to do Flash code and PHP code than copying the code from the web. "I don't think that is useful. ... I would rather choose to figure it out myself." He finds it "fun" to find different ways to execute code. He regularly speaks of inspiration and his goal is not



merely to meet course requirements such as completing and passing assignments. He reports that he engages in a lot of “additional learning” through the web.

He declares that if one is not enthusiastic about one’s assignments one will stick to the brief. “Luckily I can say that I am always enthused to do something.... So when I get for instance an HTML project then I always want to go above and beyond what they ask for.”

Although he wants to be a web designer, he sees intrinsic value in all other aspects of his course. “It (design) is definitely what I wanna go into but I also want to know something away from the brush. Away from the application. Like I know my HTML and CSS so I don’t want to improve on that. I can actually improve on that but I don’t have to. ... That’s why I set a goal for myself to learn JavaScript fully.... I really wanna be able to do Actionscript properly.”

Although his goal orientation towards his studies is largely intrinsic, he regards having a rival to beat as a source of motivation. But he is friends with his main rival in class “...because we are so similar in terms of where we excel, our methods of getting better and what not, is mostly the same.”

He states that in first year he did not really have a rival and therefore “manifested one” by spending a lot of time on the internet, looking at other people’s work and “trying out different things.”

He regards pressure from lecturers as a source of motivation and wants his parents to put more pressure on him but states that “it’s more about the pressure I put on myself than what my parents do. ‘Cause their pressure impacts on me about 5%? And the rest is me.”

### **Task value**

Although he is not “a fan of PHP”, he can see its usefulness. “Like when I’m doing my CMS, my content management systems, then I find PHP extremely useful. Then I love PHP.” This does not only indicate the attachment of a high value to tasks, but also intrinsic goal orientation. It also signifies effort regulation in the face of a task that the student finds difficult or uninteresting, which PHP is for John.

### **Control of learning beliefs/Outcome expectations**

In terms of outcome expectations, he was asked whether he thinks of marks when working on an assignment. “It’s definitely not the marks! It’s the end result. I like my end result. Did I do this well, can I make it better? I don’t think about marks when I do anything. ...

### **Self-efficacy**

John has very high-self-efficacy beliefs. “...I’m generally confident about everything, the only thing I’m not that confident in is PHP, but it’s not my inability to do it. I’m not confident in myself enough about wanting to expand my knowledge. My PHP.” But he states that he usually gets the highest mark in the subject.

He rates his confidence in his ability to handle difficult tasks at seven on a scale of 10 “because I would hate to be overconfident. ...” Throughout the interview, he refers to his ability to handle all aspects of the course.

### **Anxiety**

Due to his high self-efficacy beliefs, there is no evidence of worry or anxiety over his abilities to excel or complete assignments successfully.

### **Cognitive and metacognitive processes**

#### **Rehearsal/Elaboration/Organisation**

John does not really memorise material but says he goes back to the tutorials or class notes. Due to the fact that assessment in the course depends to a great extent on continuous evaluation, students do not really need to memorise material but internalise or learn work through regular practice, which John continuously refer to during the interview.

In terms of elaboration, he doesn't take notes in class because he prefers to think and has a “knack for listening and then remembering”. But he might write down a few key points in his notebook. “If I catch something in class, say for instance about Flash then I'll think, I've got something about Flash and I'll read over it and if I have to go back and I noticed the pdf was more comprehensive than what we've learned in class then I go back to the pdf instead of going back to my book.”

More than once he refers to incorporating different aspects of the course when working on assignments. He for instance uses Flash, etc. if there is a capacity for it. When he gets a “fit of inspiration”, he goes “through a lot of stuff I've previously learned and then try to apply that.”

He does not make explicit reference to organising strategies but this is evident from his description of how one needs to plan and conceptualise before building a database.

### **Critical thinking**

He also likes to experiment. “... there's always time to find out different ways to execute certain codes. For design as well. There's no real need to go and check out for CSS codes and Flash codes but it's fun to see different ways to execute what you want to do.”

He doesn't take everything at face value and questions for instance why certain things were discussed in the design class, but then he “gets to the point when you see what the lecturer is trying to teach you.”

### **Goal setting and planning**

In terms of planning, he sets proximal goals and states that he never searches without a purpose. “I have a topic that I want to look at for the day. Like today I did a search for Flash portfolios, normal portfolios, JQuery portfolios.” And he comes to conclusions about what he is studying. “... what differences there are between layouts, the three types of portfolios and just the general knowledge of the portfolios as well.”

When asked about his goals for the June holidays he states that he wants to learn Actionscript. He has a plan in place. "I have a folder at home that's dedicated to June. That is my work for June." He engages in significant information seeking and reports that he works through all the tutorials that he downloads.

### **Self-monitoring**

John tracks his personal functioning and thoughts and is able to explain how he thinks and functions. He stays focused in class and states that students don't understand PHP because they don't listen in class.

He has high metacognitive awareness and on number of occasions during the interview explains his thinking and way of working. He explains why he finds PHP challenging "... It requires quite an amount of time to think, and then execute and then go back to see where your error was and execute again. ... one stage is about trial and error, but it's mostly about conceptualisation in PHP. You have to think before you do."

While working on PHP he asks himself "Is your logic correct? Conceptualisation. Do you follow the correct key words, is your PHP structured properly? ... You have to use the right loop, like the right variables. It's all about the choices beforehand. The equation you can always change, but not the structure of the code."

### **Self-judgement and self-reaction**

Although he gets motivation from outperforming other good students, he also competes against himself or against good work he finds on the web, as could be seen from an earlier example. He describes his fits of inspiration as follows: "I suddenly get an idea and then I want to apply it. Like creative inspiration more or less. Because that in fact enhances my design ability because trial and error is one of the best ways to learn something. ... I try to convert my inspiration to be in fact visible. I do go through a lot of stuff I've previously learned and then try to apply that."

John is able to evaluate his own performance and when asked what he does when he gets worse marks than he thought he should, he states that it doesn't happen often but when it does "it was because I didn't put in the time. And I figured that out. So I decided to stop that habit and put enough time in on my next project. ... If I got worse marks than what I got before, then I have an internal problem with myself then I sort myself out."

He does not only track his own functioning but reacts to correct behaviour detrimental to his progress as can be seen from the example above. He also states that he was overwhelmed by too many assignments in the first year but by second year "got used to that and I would do the research ahead of time."

John is also able to adapt his learning strategies based on the style of the lecturer. Where the lecturer does not engage in a lot of explanation John engages in self-study and work through tutorials on the subject instead of blaming the lecturer's teaching methods as some of his class mates do.

He analyses why he encounters problems and attributes his lack of understanding to issues that are controllable. “With the in-house functions of databasing I encountered sort of a problem. ... I haven’t seen examples and done enough of it to fully understand it.” This also indicates that he sees a link between effort and outcome, which is also part of self-efficacy and motivational beliefs.

## **Resource management processes**

### **Time and study environment**

John is able to explain how he prioritises his assignments in terms of difficulty and due date. He also states that he always “makes time” for additional study. He reports that he engages in self-study over weekends. John says that he never hands in assignments late. He indicates that he is not always able to control his study environment because people ask him for help in the lab when he wants to work.

Although he does not have an important resource, the web, at home, he circumvents this problem by downloading what he needs in the lab, so that he can use the resources at home.

### **Effort regulation**

John does not seem to experience any trouble with effort regulation. He appears to simply regard any difficulties as part of his studies and work.

### **Peer learning and help seeking**

Apart from his earlier reference to his “main rival” he does not indicate that he needs to seek help from peers regularly but indicates that he engages in peer learning. He “speaks to (student name)... because “he has an amazing perspective on design that not a lot of people have.” He also does not need to seek a lot of help from lecturers but likes to ask experienced friends who are already working in the field for advice. He laughingly admits that many students approach him to explain work although it often interferes with his time. John also states that he prefers to try and sort out a problem himself before looking for information on the web.

# Cyril

Cyril is a 20-year old coloured male who went to a former HoR or traditionally coloured school. The main breadwinner in the family is a technician with a Grade 12 qualification.

Cyril has had access to a computer at school and at home since the age of six and has 3-4 years web experience. He has a PC at home and a Wap-enabled cell phone.

He spends 15-20 hours per week on the web in the lab en 1-2 hours per week off campus through his cell or at a family member's house. He does not have internet access at home.

In terms of web use, he states that he doesn't have a Facebook page "as I don't have time to keep up with folly." E-mail takes up 5% of his web credits, downloading material for the course and assignments, 40%, and 55% of his web credits is spend on self-study.

He says that he does not use his cell phone "a lot of the time" to look for information related to his course, because he tries "to get all of my information when I am using the web at campus". He uses his cell phone for SMS or instant messaging, calls and looking for information, in that order of importance.

Cyril states that he goes to the lab when classes are over and describes himself as "crazy about the web". He finds it very easy to find information on the web and doesn't stop until he finds what he is looking for.

## Motivational processes

### Goal orientation

Cyril states that as with anything in life "when obtaining knowledge, it is crucial to go further than what is taught." He states that his motivation comes from within himself because he has to please himself and not other people. The main driving force in his studies is to excel in what he does. "So that I can be top of... well not top of the class but top when it comes to the skills that I obtain".

Cyril does admit that he wants to better than most people in the class but he competes more with himself: "I find myself to be very challenging." He doesn't feel that his parents put a lot of pressure on him to perform but says they've always been very firm. "You have to get to matric and after that then study, always to be the A student."

### Task value

He sees value in all aspects of the course and only "excludes things when I'm doing things on my own, doing it for myself." He feels that for him as individual it is not enough to only learn what is presented in the course. "I want to further myself."

### Control of learning beliefs/Outcome expectations

He expects to get above average marks because "I've been working hard this year. Very hard. I'd say good, better than average." When asked whether he is generally happy when he hands in an assignment he states that he thinks he could always do more: "It's good, but it could be better".

## **Self-efficacy**

Cyril seemingly has high self-efficacy beliefs. He says for instance that apart from coding in SQL, “the rest seem pretty easy or rather I can cope with it.” He also states that he understands everything immediately. “Because I’m the type of person you can show something once and I can do probably better.”

However, when asked how confident he is about his abilities to handle difficult tasks he states “My confidence levels are not that high. But it doesn’t get me down though. I still get to doing that work. During that my confidence grows.” He rates his confidence in his abilities to handle difficult tasks as eight. He also feels that he will probably excel in the workplace.

## **Anxiety**

He says that he controls his studies and cannot let his studies control him because he would fall behind and that would stress him out. But apart from this statement there doesn’t seem to be any other indication that he experiences anxiety about his work.

## **Cognitive and metacognitive processes**

### **Memorisation/Elaboration/Organisation**

Cyril says he does not have to memorise anything because he has a photographic memory. In terms of statements indicating that he uses elaboration strategies, he says that in class he tends to think a lot about what is being said, where it fits in, does he understand it, can he do it and how would he achieve it.

He says that he does not write out plans for a particular assignment: “It is always all in my head. I plan from the moment I get the task and always configure the plan throughout in my head.” But he does make “doodles and sketches” for his design and “now and then make notes or outlines for things to be done.”

### **Critical thinking**

When he is busy with a challenging task he asks himself what would be the most logical way to do the task. “And start remembering everything that was taught to me and what I picked up along the way and how it fits into that.”

When he goes home, he thinks of what was said in class, “so that I can get a good understanding” and make sense of what was said in class. He says that he doesn’t necessarily always agree with the lecturers because he always tries to be “original”. “But I do it in a way that’s not rebellious.”

He also treats the course as a starting point and says, “this is just giving a foundation. .. When you come to study this course or any other course, they just give you a foundation and you have to figure where you are going to put yourself. In this country, ... a lot of people want everything just to be given to them and that’s not how people made it in life. They had to go and figure it out for themselves.”

## **Goal setting and planning**

He sets proximal goals and explains that when doing tutorials he starts with “tutorials for beginners.” He works through all the tutorials that he downloads so that “when I need them later, I already know how to do them and go through it quickly and further than what is expected”.

He states that he does not have a specific strategy for his studies but when he gets a project or assignment he “gets to it immediately”. He also says that “in life you do not get the time to do the things you want to do so you have to make the time.” Therefore, even during busy times, he makes time to study things that he struggles with.

Over the coming three months, he wants to improve on all his skills so that he has more than the basic skills of a student. He also sets limits to the time that he gives himself to complete tasks.

## **Self-monitoring**

Cyril seems to be self-recording and monitoring his own thoughts and conduct continuously. When he thinks about his studies, he asks himself: “Have I got any assignments? Have I completed my assignments, what can I expect next in class. Am I prepared for it and what can I do to improve my skills?” Apart from his technical skills, he does “little puzzles and stuff” and “brain exercises” to improve his cognitive abilities and memory.

Cyril is also able to state exactly what he finds difficult in SQL, which is the only topic in the course that he finds challenging. “Structuring of the code in the correct SQL sequence that will run the actual statement.”

When difficult topics are dealt with in class he states that he becomes more focused to ensure that he understands.

When the pace in a particular subject or class is too slow for him he will “go further than anybody else. “Like with the technology as (the lecturer) was speaking about (in a mock interview), I do stuff in five minutes. ... Even though I’m way ahead, done, I’ll still go on doing other things related to that.”

## **Self-judgement and self-reaction**

Cyril is not happy to have just the basic skills required for the course, as can be seen from statements above. He wants to go above and beyond what he is being taught. Although he also measures himself against the performance of the top performer in the class and his friend, John, he says that he competes more with himself than with others.

In terms of correcting behaviour, he reports that he no longer procrastinates because then he would fall behind or do a “rushed job”. He says that used to procrastinate “but got that out of me because that’s not gonna help me in anyway”. He also no longer stresses about assignments after he handed them in because “it doesn’t help me to get the thing any better.” These efforts to control his thinking and state of mind also comes out when he describes his thinking process when he has to do something difficult. “I have, it’s not fear, I realise that but I’m going to say to myself but I can do better. I can get this. It won’t be difficult for me.” He

also states that “when it comes to the second time, I would know where to go better. Where my mistakes were.” He says that it almost never happens that he does not understand something in class. However, if it does happen he needs to sort it out immediately “because I don’t like negativity in my life.”

## **Resource management processes**

### **Time and study environment**

Cyril reports that he always submits his assignments on time and doesn’t restrict his study activities to when he has assignments. He prefers to work where other people cannot disturb him for help. He listens to music when he works because it helps him to stay focused.

### **Effort regulation**

Like John, Cyril does not have trouble with effort regulation. He seemingly finds most aspects of his studies “pretty easy” and as mentioned above, states that he does things fast and then go further than what is expected. When he struggles with something, he first tries to “figure” it out logically and would then go to the web if a lecturer is not available or a fellow student would not know the answer.

### **Peer learning and help seeking**

Cyril reports that he regularly consults lecturers but mentions that fellow students “are on the same level as you and knows as much as you, so you cannot expect them to know more than what the lecturer or textbook can offer.” Therefore, he rather relies on web searching, textbooks or a lecturer when he struggles with something.

However, he says that he does have discussions with his classmates about work but when it comes to assignments “we’ve figured out who’s on the same level. .. We don’t have to say much to understand what is happening... If I say this is how it should go, (student name) would understand what is meant by that. And he would figure out how it should be done.”



# David

David Petersen is a 22 year old coloured male who attended a former Model C school. His father is a senior technician supervisor and has a national diploma.

David had access to computers at secondary school and at home and has 5-7 years experience of computer use and 4-5 years of web experience.

He has access to a PC and laptop at home and he is one of only three students in the class with web access at home. When he is not in the lab he accesses the web at home, at a friend's house and through his WAP-enabled cell phone. Despite having 5 GIG at home, he still accesses the web more in the lab than at home and spends 9-10 hours on the web in the lab and 7-8 hours at home.

He estimates that he spends 10-15% of his web credits on e-mail, 15% on information not related to his studies, 40% to assignments and class work and 30% to self-study. "I will teach myself other programmes at the same time that we're not taught at university." He doesn't use Facebook at all and might occasionally go to YouTube but this he also uses for video tutorials.

His main use of his cell phone is for social purposes: SMS, calls and looking for general multimedia information, in that order. He says he doesn't use his cell phone for checking multimedia info for long times, but just "for quick check" when he is not in the lab or at home where he has web access.

In his questionnaire he indicated that he "manages" when looking for information on the web and doesn't stop until he has found the information. He says that he does focused searches on the web and "doesn't branch off".

He describes himself as crazy about the web and he goes to the lab after class.

## Motivational processes

### Goal orientation

David has an intrinsic goal orientation. His goal is not merely to pass the multimedia course well but he says the course as part of his goal to master the field. "I think the assignments we get helps me ... If I get work, I go on the web automatically and get new information for myself at the same time. So for me it's like assignments helps me to gain more knowledge in multimedia."

"I'm totally against sticking what they teach you here ... I'm for a lot of browsing and self-teaching." He declares that "the internet motivates me. 'Cause I'm always on the internet and that gives me motivation to go work at home or in the lab. 'Cause if I see something that I like in the lab, I go and do it ...". Although he is mostly design focused, he likes development as well." He does not compare himself to other students and mentions that he prefers to design at home so that his designs can be original.

Although he aims for high marks in his assignments, this is not his main goal. He constantly talks about his additional learning. He reports that he is not competitive at all and "if

someone's design marks are better than mine, it doesn't affect me at all." His parents "back him 100%" in his studies.

### **Task value**

He says that most of the time he sees his studies as a challenge, exciting and doing something different. "It's very minimal just to get it done. For me that's just laziness".

However, he admits that he does not really like PHP as can also be seen in the statement below.

### **Control of learning beliefs/Outcome expectations**

He feels that he will need all his "extra applications" in the real world and feels that it will help him to get "good good" marks and a good job. He is confident about the outcome of his studies because I know that I'm doing my work. However, he feels that with PHP there is "just that feeling there's a slight chance that you might fail or just pass because of the level of difficulty." David evaluates himself as "not **very** hardworking, but hard working." He states that after he has taught himself a few things during the holidays, he thinks he can "definitely do much better coming back." He therefore believes that his efforts will have positive outcomes.

### **Self-efficacy**

He has high levels of self-efficacy and regularly declares that he is happy with his work. However, in terms of PHP, he has low self-efficacy. "With the Actionscript, it isn't bad cause I can have a good understanding and I do enjoy Actionscript. But I don't enjoy PHP as much." But despite this he feels that he is still confident about handling difficult tasks because his work is "up to standard." He is also proud of his designs because he does his own work. He says that in the lab, people copy each others' designs especially when they haven't started their work yet. He rates his confidence in his ability to handle difficult tasks at 6 or 7, which is on the low side compared to some of the other students interviewed.

### **Anxiety**

Although he struggles with PHP he states that he does not "stress myself about doing difficult things, I just take it as I can learn new things for the future, something new I can use."

### **Cognitive and metacognitive processes**

#### **Memorisation/Elaboration/Organisation**

He also "writes down in a book. ... Plan beforehand with mind maps and brainstorming and things like that. For me personally brainstorming helps a lot to throw ideas out there, "cause you can just start writing down things and then you can start taking things out."

He doesn't feel it is necessary to memorise anything because "I do quite a bit of tutorials and once you do it a lot, it becomes second nature."

"Most of the time" he takes notes and "look through it and from there internet and research that specific things that I wrote down. .... Sometimes class notes help you but not to the full

extent. You can maybe get more info on the internet that you can use in projects or assignments.” Self-instruction is evident throughout the interview.

### **Critical thinking**

He critically thinks about what the lecturer is saying in class except in PHP where “you’ll lose him” if you don’t focus. He regards the course as a starting point and regularly refers to getting more information than what is presented in class. “Class notes can help you but not to the full extent. You can maybe get more info on the internet that you can use in projects or assignments or that.” He also forms his own ideas and says that he has his own “frame of mind”, which might be different from that of the lecturer or lecturers.

### **Goal setting and planning**

David sets proximal goals and executes them. Over the next three months he wants to learn more new applications. He is currently teaching himself After Effects, a video editing programme despite the fact that his main interest and passion is design. He also taught himself Illustrator. He also wants to get really good marks and plans to job shadow his friend in the multimedia industry over the holidays, “or do my own thing at home.”

He works through all the tutorials he downloads. “I’ll download what I can do in the same day. So I’ll download like six, seven of them and I’ll do them all at the same time.”

When asked about strategies for his studies he says that “... if I have work, I’ll go home and relax first. .... if I start working, I won’t stop until I’m finished or dealt with the specific thing. Like if I have a project that’s due next week, I’ll do it in stages and I won’t stop until I’m done with that stage ... If there’s no work, almost every second, third day, I’ll sit down with my laptop and I’ll go through some programmes so I can keep up to date and not forget anything ...” Even in holidays, “.... I enjoy working in the morning, very relaxed, quiet. ... I don’t wake up in the morning and think, oh I must do this. I don’t contemplate. I’ll just get up and do it.”

### **Self-monitoring**

He rechecks his work and after a test or assignment, tries to find out where he went wrong. “If they tell me I’ll go back in my own time and see if I can get that information to fix it up.”

His metacognitive awareness is relatively high and he is able to explain the way he works and his thoughts while engaging in difficult tasks. “Well if I start with an assignment for PHP I’ll first get the basics, like the code and I’ll first try to understand what’s going on in there. And then I’ll go on to the assignment cause the assignment might be structured with that specific code. And I’ll then read over the brief to see what they’re looking for and I’ll try and put that in the basic code and then see what extra code needs to be put in there to make the code work. Once I have the basic code sorted, I’ll probably use the internet to research to see what other code I need to put in there.”

### **Self-judgement and self-reaction**

David says that he does not compete with classmates and also likes to have his own unique designs. Therefore, he prefers to work at home. As mentioned above, he is “totally against”

learning only what is required for the course and regularly refers to doing more than what is learnt in the course. This indicates that he sets high standards for himself and tries to improve on what is being taught in the course. He also says that he expects good marks because he has been working hard.

There are regular references to the teaching style of different lecturers and how he adjusts to that. Where lecturers only “touch on” certain topics, he teaches himself. He makes no comments that indicate that he blames external factors for his performance.

David makes a number of statements indicating that he tracks his own functioning and responds appropriately. He states for instance that most of the time after class “we’ll have those notes that we took down and I’ll ask a friend what is going on and if he doesn’t understand ... we’ll ask somebody else who has an understanding of PHP or we’ll go on the internet.”

## **Resource management processes**

### **Time and study environment**

David has good time-management strategies and says that he never hands in assignments late. As mentioned under goal setting and planning, he tackles big assignments in stages and ensures that he finishes each stage in the time that he set for himself. Unlike some of his classmates, he feels that lecturers give students enough time to complete assignments.

He prefers working at home “‘cause at tech you wanna focus on something and students come and ask you for help.”

### **Effort regulation**

He does not seem to have a problem with effort regulation as is evident in his description of his work strategy, i.e. when he sits down to complete a phase of his work, he doesn’t stop until he is done

### **Peer learning and help seeking**

He regularly seeks help on PHP from a friend who enjoys PHP. If the friend doesn’t understand “we’ll go on the internet. ... The internet will explain that specific code and what it does.” He approaches lecturers to explain where he went wrong in tests or assignments. As mentioned, other students also approach him for help. He says that generally he does not approach lecturers often but does ask the PHP lecturer for help because he always encourages them to ask when they don’t understand.

## **Sipho**

Sipho is a 23-year old black male who went to a traditionally black school in a small town. His father works in broadcasting but Sipho is not sure what his level of education is.

He has had access to a computer at home and at school since secondary school. He now has a laptop. He has 9 -10 years of computer experience and 4-5 years of web experience.

He accesses the web 15-20 hours per week in the lab and 9-10 hours per week outside the lab. Despite a concern that it is expensive, Sipho has wireless internet access in his room on campus.

He had difficulty giving a breakdown of his web use but estimates that 20% of his web use is for self-study. He spends roughly 10% of his web credits on Facebook and e-mail, 15% on general information like reading the news, 45% on downloads and information for course work. This leaves him with 10% of unallocated time.

He accesses the web minimally through his cell phone because he can't read "a lot of things" on his cell phone. His three top uses of his cell phone is: calls, SMS or IM and social networking.

He describes himself as being crazy about the web. He finds it easy to find information on the web and keeps on trying if he does not immediately succeed in tracing info.

He goes to the lab after class.

### **Motivational processes**

#### **Goal orientation**

Sipho has an intrinsic goal orientation and feels that "... you develop an interest (in your studies) and you start spending more time practising things, looking for tutorials. It just happens."

He reports that sometimes he comes across something like an animation on the web when he's browsing and then he tries to do something similar. He then searches the web for information to see how it should be done.

He reports that he does his own work about 3 times a week. He states that what motivates him is looking at people's work on the web and thinking that it was done by people just like you. He states that looking at the work of overseas multimedia students motivates him.

He states that his parents do not put any pressure on him to perform; only his brother who is a software engineer "who is very good." Sipho also does not compete with anybody in class.

He says that although it is important for him to get good marks in his course, the learning aspect is more important. "You can get good marks but at the end you find you didn't learn anything. So for me it's about learning, what I really, really learned here."

### **Task value**

Sipho describes himself as an allrounder, meaning that he feels he is able to handle all aspects of the course and does not focus on a single aspect of the course to specialise in. He says that he struggles with development but he looks for answers on the web.

However, he admits that he does not have a real interest in PHP. He also admits that there are aspects of the course that he does not regard as valuable.

### **Control of learning beliefs/Outcome expectations**

He sees the connection between effort and result and says that if you didn't spend enough time on an assignment "you can't be satisfied." He expects to achieve good marks at the end of the year.

### **Self-efficacy**

Sipho is fairly confident in his abilities. However, he feels that he works too slowly and this hampers his confidence. He rates his ability to handle difficult tasks at 8. He also feels that the web provides valuable backup because "in multimedia there's nothing new you are doing. You are doing what other people have done."

### **Anxiety**

Except for expressing concern about the pace at which he works, Sipho doesn't seem to experience much anxiety. However, sometimes when he has too many assignments he feels that "this is too much. I just want to finish with it."

### **Cognitive and metacognitive processes**

#### **Memorisation/Elaboration/Organisation**

Sipho states that he doesn't really organise his thoughts on paper but would make notes on his cell phone when he gets an idea. He also takes notes in class and keeps them for assignments.

### **Critical thinking**

He reports making connections between what he hears in different classes and develops his own ideas about what is said in class. In his questionnaire he says that he doesn't always agree with what the lecturer is teaching because he had seen better ways and methods of doing what is being taught. He sees connections between what is being taught by different lecturers. "I get those a lot."

### **Goal setting and planning**

Sipho sets proximal goals for himself and carries them out. For the holidays he wanted to complete his portfolio. He also planned to produce a promotional video for his father during the holidays.

Sipho draws up a timetable for himself when he has a lot of assignments. He also prioritises and does easier assignments closer to the deadline but might start 2 months ahead of time if the assignment has a big weighting. He says he does sometimes postpone work when he finds something interesting on the web. He also states that when he has a lot of assignments he “strategises” all the time.

He states that he works through most of the tutorials that he downloads because he usually downloads them when he needs information. He also has a lot of bookmarks.

When he gets assignments back he checks where he went wrong and states that 80% of the time he will do better in the next assignment.

He taught himself additional video editing packages although this is not his main interest. He also taught himself InDesign, which is not part of the course. He sees the course as a starting point and states that lecturers cannot teach everything.

### **Self-monitoring**

When he sees HTML, CSS and Actionscript code which they are not being taught, on the web, he teaches himself. However, he struggles to describe what he finds difficult about PHP. He states that if he has to build a website using PHP he can do it but when doing class work he cannot always see the connection to reality. He also states that if he didn’t understand something in class he would try and find out afterwards what he needs to do but this does not necessarily apply to PHP.

He does not go into detail when describing his thoughts while working on a challenging task. He says that he focuses on what needs to be done to achieve the end-result. However, when he works through tutorials he will do cross checks with other material if there is something that he doesn’t understand.

### **Self-judgement and self-reaction**

As mentioned, he does not compete with classmates and appears to set his own standards, guided by what he sees on the web (as can be seen from his quote on how he tries to do what he sees on the web)

He reports feelings of satisfaction when he has worked hard. “You feel proud of yourself.” But when he didn’t put in enough effort he is not satisfied with the end result. He goes back to assignments where his results were not satisfactory and thinks how he could have done his work differently.

### **Resource management processes**

#### **Time and study environment**

Sipho prefers to work in the lab at night because it is then quiet. He says that he sometimes listens to music when he designs but when he is coding he doesn’t. He doesn’t hand in assignments late but often feels that he would have liked to work harder. His decision to get a wireless connection in his room also indicates that he took action to circumvent difficulties in access to the web.

As mentioned above, he is concerned about his ability to work fast but doesn't hand in his assignments late.

### **Effort regulation**

Sipho admits that he doesn't put a lot of effort into PHP because he doesn't have a real interest in. However, when he struggles with web development he looks for answers on the web.

### **Peer learning and help seeking**

He consults friends when he struggles with an aspect of the course. He has identified individuals in class with whom he has discussions about work. If they cannot help him he consults the web but he does not really consult with lecturers. He has a problem with group assignments because he feels that you either end up doing the whole assignment because group members don't work, or one person dominates and you end up doing nothing.

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## Thabo

Thabo is 23-year-old black male and attended a traditionally black school in a small town. The highest qualification of the breadwinner is matric and his father is “involved with the church”.

He only started using a computer when he started his studies, which means that he has 2-3 years of experience in computer and web use. Although it was initially hard for him, he taught himself and learned” very quickly”.

He lives on campus and for most of his studies he did not have a computer in his room. He only recently got a laptop. He spends 20-25 hours per week on the web in the lab and goes to an internet café when he visits his home town. He does not have a Wap-enabled cell phone but this does not seem to be for monetary reasons because he works as a lab technician, earns additional income and describes his fondness for fashionable clothes.

He has difficulty saying how much time he spends on each aspect of his web use but describes it as follows: He “honestly likes Facebook a lot”, and spends 30% of his hours on the social networking site, 5% on e-mail and 10% on looking for information not related to his studies. “I’d say 45-50% I’d just be downloading. ... It’s mostly not for assignments. Just for my own work.”

### Motivational processes

#### Goal orientation

He feels that there are a lot of students who rely on what they get from lectures and “they still pass but they don’t excel and they wonder why because they don’t get up and work and practise what they are taught and even go further.”

He has a passion for manipulating images and designing in Photoshop but also puts effort into coding (development) because “I need a place to showcase that photo I’ve manipulated.”

He states that he spends most of his time on self-study and focuses on assignments when he gets them. “For now I want to design this amazing portfolio, showcasing my work. If I’m done with that I’ll get a company hopefully who does what I wanna do and I get to learn more from that company. I’m not really aiming to start earning when I start my in-service training. I just want to learn as much as possible so that if I move to Johburg next year then I have this experience ...”

He admits that he does not like PHP and only works on it when he has an assignment.

When asked whether his parents motivate him he states “Noooo. All my life I was by myself. ... “Mostly it’s like I can’t come all the way from Polokwane to Cape Town to fail. Okay my friends are doing good as well. Ah, my other friends are at UCT, they’re gonna get good jobs, so it’s push, push, push.”

However, he feels that he doesn’t have self-motivation unless he likes something.

“But mostly it comes when I’m competing with somebody or some website that I have seen. Then I say, I’m gonna do this better than that website or I want to create this thing that’s more better than...”

When asked whether marks are important to him he replies: “ Yes, they are but it’s mostly what I can do than the marks. I don’t determine the quality of my work through marks.”

### **Task value**

He states that he has a bit of a negative attitude towards PHP. “At first I really wanted to learn PHP but I couldn’t, it was hard for me to learn PHP and learn how to use a mouse. ... After that it was very hard to catch up with people. Especially in PHP. The only thing I could do is pass the course but not really excel, like get high, high marks.”  
He says he never gets bored in class because there’s always something new, something I can learn..”

### **Control of learning beliefs/Outcome expectations**

He indicates that he gets the marks he aims for. Although he tries to understand everything, “in some subjects I just can’t so if I get an average mark, I just let it be. But for some subjects I wanna get top marks.”

### **Self-efficacy**

He displays fairly high levels of self-efficacy and declares that he never really struggles with his studies. Even when he talks about aspects of the course that he finds difficult, he still makes positive statements about his abilities.  
When asked how confident he is about his ability to handle difficult tasks he declares “I think I have the confidence to do that. ‘Cause I always aim for the moon, so I land on the stars. ... In general, like my course? When it comes to PHP, I lack a bit but if I have to do difficult things, I push, push, push, so I’d say 70% . (For other things), higher, maybe 80 plus.” He also expects a good mark at the end of the year. “I think I’ll have a very good mark, say 60, 70. If not more.”

When asked whether he feels that his skills are good enough for the workplace he declares: “Yes, Ja. I think what I have now, although it’s basics, I have to learn a bit more but I’m confident that: he’s coming, he’s coming, or he’s wow!”

### **Anxiety**

Thabo does not appear to experience anxiety with regard to his studies. He seems to brim with confidence and passion for his studies.

### **Cognitive and metacognitive processes**

#### **Rehearsal/Elaboration/Organisation**

He reports that he does not have to memorise anything because “it just gets there ... I am always practising. I don’t have to go back to a tutorial. ... “

He reports that he organises his thoughts on paper when he works on assignments but not on his self-study work. “Mostly on my own work, I’m still experiencing things, okay I can do this and this, oh I can do that! Then I add it. So I can’t plan it down. ... For my designs, I will do that when it comes to my web page, home page. But I also draw, put it on Photoshop before I actually design it with CSS.”

His does not make summaries because he knows where to find what he wants and goes straight to his tutorials. Because he downloads more than one tutorial on a topic, he does cross checks between tutorials if he does not understand something.

He reports that he takes notes in class because “when I go to res I take all my notes and I try to practise “ ‘cause if you just take notes and put them away, when I go back I wont understand what I was trying to do. But if I practise them.... . “

### **Critical thinking**

He regards the course as a starting point and likes to experiment with his design and find alternative ways of working. He states that when the design lecturer explains work, “I tend to ask, can you also do this?”

### **Cognitive and metacognitive processes**

#### **Goal setting and planning**

Thabo sets proximal goals in that he continuously self-studies. He intends to put his portfolio online during the holidays and plans to spend his evenings at home on his studies and socialising with his family during the day. But he declares that he doesn’t really have “his own way of strategising things.”

He states that he works through 90% of the tutorials that he downloads. He also downloads more than one tutorial on a particular topic in case he doesn’t understand something. “Those are simple and quick tutorials. Then you have those where you have to work through it maybe in 3 days and concentrate.”

“My plans for the holidays ... I’m gonna work most of the time at night and during the days its family, family, family going out. Then the weekends are gonna be church, church, church. Brass band, brass band.”

Part of his goals is to work as lab assistant so that he has his own pocket money because his father does not support his study choice and is reluctant to help with money.

He mostly works on his studies during early afternoons, late afternoons he goes to work as lab assistant until early evening and at night he studies.

### **Self-monitoring**

When he struggles in a test or felt he did badly he doesn’t wait for the results but asks class mates after the test how they executed certain functions. If he does not understand something in class (which he says is not very often), he checks his notes or asks a classmate.

When prompted about his thoughts when he engages in something difficult he states “in PHP we only do MySQL and Yog and Workbench and you do Netbeans. Netbeans and PHP, cause Netbeans is where you make the data changes without touching the tables. ’Cause that’s where I mostly struggle in PHP. ... you can create those tables in Yog and put data in the tables. You can also maybe add a code that maybe says you are selling Simba chips and you have like a table, Simba chips. There must be a code that you can set there. Say it’s an “if” statement, if three packets of tomato are sold “add” what what what on the table. That’s where I tend to struggle. Putting the code in.”

### **Self-judgement and self-reaction**

Thabo appears to set his own standards as can be seen in his statements about continuously practising his skills and his reference to his classmates who wonder why they don’t excel when they don’t “get up and work and practise what they are taught and even go further.”

He feels that in one subject the lecturer does not teach much. Therefore his strategy is to teach himself. He indicates that the way he works has changed from first year because he now “knows how things work, where to get what, so I work faster”.

He also attributes part of his success in his studies at school and university to “choosing good friends” who puts their studies first.

### **Resource management processes**

#### **Time and study environment**

He feels that he has enough time to research things that he struggles with because “you’ll find that we’ve been given the work like months ago, or weeks ago. That’s why I always submit in time, for me it’s enough.”

When asked whether he procrastinates he states that he starts immediately when it’s design but he procrastinates when it’s PHP. When he works on design assignment he mostly finishes ahead of the due date and adds more work if he gets new ideas. For his other assignments “I have to work very hard for them so I don’t really finish ahead of my time, I finish on time.”

He likes listening to music but feels it is not necessary to use earphones to shut out noise from the lab. “People who are always there are people who wanna work.”

### **Effort regulation**

He is very persistent in finding solutions to problems and uses his tutorials when he struggles.

### **Peer learning and help seeking**

He asks one of his friends for help with PHP but usually first try to solve the problem himself. He reports that he never really goes to a lecturer for help because he tends to get the necessary help from his classmates. He also states that group of friends have discussions about class work “all the time”.

## **Thandi**

She is 20-year black female and attended a traditionally coloured school, which she describes as a private school. The main breadwinner in the home is an educator with a bachelor's degree.

She had access to a computer and the web in secondary school and has 7-8 years of computer and web experience. She has a laptop and Wap-enabled cell phone. She lives on campus. When she is not in the lab she accesses the web at an internet café and through her cell phone. She reports that she uses the web in the lab for 7-8 hours per week and 1-2 hours per week outside of the lab.

Her main use of her cell phone is for social purposes and she uses it for the following in order of importance: calls, SMSs, music, social networking. She states that about 15% of her cell phone use is to access the web.

She reports that 25% of her web use is spend on Facebook to which she thinks she is addicted. She spends 10% of her credits on e-mail, 60% of her web use is for downloading and finding material for her assignments and 5% for self-study when she is not busy with assignments. When asked how often she engages in self-study not related to assignment she says "Not a lot .... Once in a while." She reports that she goes to the lab after class but also appears to have quite a busy social life.

### **Motivational processes**

#### **Goal orientation**

Thandi appears to lack an intrinsic interest in her studies although she mentions that she "loves" the course. Her main focus seems to centre on meeting the requirements of the course and getting high marks. "Marks. I just think high marks (when working on an assignment)."

Although she states that she motivates herself and tells herself that she wants to do better, she also regards her family and friends as an important motivational force, despite the reference to her father's lack of understanding for her choice of career. "They do support me. They always tell me to push myself." She also states that her parents put too much pressure on her and "you think, what if I don't succeed and all that? ... it pushes me harder so that I can make them proud. "

#### **Task value**

Even though she doesn't like PHP she "discovered" that she will be expected to do things that might involve PHP. "I must know the basics." She therefore can see the usefulness of PHP.

Thandi is concerned about the value of her course. Her friends "say it's for lazy people and stuff ... Even at home. My father doesn't understand why I'm studying multimedia. .... I always think about the future I have in the career I've chosen. I love it but I'm thinking, did I make the right choice? I do love it, but I think, what opportunities to I really have out there having studied multimedia and those things?"

### **Control of learning beliefs/Outcome expectations**

In terms of her PHP, she has decided that she does not have the ability to pass PHP regardless of how much effort she puts in. Although she sees a link between effort and her marks, she states that when you get lower marks that you thought, there's nothing you can do.

### **Self-efficacy**

Thandi appears to have fair self-efficacy beliefs in terms of being able to handle her studies in general. However, she completely lacks self-efficacy beliefs in terms of PHP. She declares that apart from PHP she doesn't have "much of a problem" with her other subjects. She rates her confidence in her abilities to handle difficult work as 7 or 7.5. When asked whether she's confident about her abilities when she has to start working she replies: "Mmmm, I think so ... I think I can manage."

### **Anxiety**

Thandi regularly indicates that she fears failing and experiences high levels of anxiety regarding her ability to handle PHP.

### **Cognitive and metacognitive processes**

#### **Rehearsal/Elaboration/Organisation**

She "almost never" make outlines or summaries but says she makes notes in class.

#### **Critical thinking**

When asking her whether she connects what the lecturer says with other things in the multimedia course she states that she just always listen to what the lecturer is saying. Even when prompted, she says "sometimes you go, oh, that's why this happens, ja, it does happen sometimes."

#### **Goal setting and planning**

Thandi sets distal goals and declares that her goal for her studies in the next three months is "hopefully I'll be in in-service training and on my way to graduation. Just finding a permanent job working and developing myself more in the multimedia industry". Although she is already on holiday she hopes to find a multimedia job and has send out her CV.

When asked about her strategies for her studies she states that she does not really have a strategy. "I just tackle my studies as they come. ... If I think it is a ...(inaudible) assignment I start working on it immediately. If I think I can manage, ah it's easy, I'll do it three days before it's due". She is unable to say whether her study strategies have changed over the course of her studies. "I just study the way I study."

## **Self-monitoring**

When done with assignments before the time she will revise her work “especially if you go to the lab and people start commenting. Why didn’t you do this like this or stuff. And sometimes you feel, okay, maybe he’s right ... and then you quickly change it.”

In class she gets distracted “a lot! I’m a student, sometimes I’d be thinking of other things and wish I was somewhere else. ... Like recently in PHP we were doing views and stuff and I just had no interest in that. I still don’t understand it as of yet. I was like, oh my God, can’t (the lecturer) just say we can go home now!?”

Her metacognitive awareness is low and she is for instance unable to describe what she finds difficult about work she struggles with, like PHP and Flash, except to say that she cannot practically apply theory. Even when prompted to explain the specifics of her difficulties with PHP she replies “It’s the practical. It’s just I always fail PHP. ... How do I say it? The theory part of PHP I can manage ... I analysed a long time ago why I fail. ....”

## **Self-judgement and self-reaction**

Thandi doesn’t appear to judge herself against any particular standard other than “getting high marks”. As can be seen from the statement about other people commenting about her work in the lab, it appears as if she regards her classmates’ opinion as the standard for which she strives.

In terms of correcting behaviour, she states that she learned it’s actually up to her to divide her time between her private and life and her studies. She is able to judge her behaviour in some regards and feels that she is lazy because she procrastinates a lot. Yet, she tries to justify this by stating that she works better when she is under pressure.”

There is little real evidence of adapting her strategies to improve her learning except to make vague statements such as having to put in more effort or “push harder”.

## **Resource management processes**

### **Time and study environment**

Thandi states that she always hands in her assignments on time but complains that during the term “you get to relax and then towards the end you just get bombarded with assignments.” She says that she procrastinates a lot.

She prefers to work at night and in her room, but then her classmates aren’t available to help her. She does not listen to music because it distracts her.

### **Effort regulation**

In terms of task persistence she mentions that she might “spend an entire day. I spend a lot of time trying to figure things out because I have to use it.” Yet her statement above casts doubts over how much effort she really puts in, i.e. although she prefers working in her room she doesn’t have the help of her classmates there.

### **Peer learning and help seeking**

In terms of help seeking she explains that she usually asks a classmate when she struggles but can't remember asking a lecturer for help, 'cause I can always call (my classmates) from the IT centre and ask, can you come to the IT centre and help with this?"

She also appears to place a high value on other students' opinion of her work as can be seen in the earlier statement that people start commenting about her work in the lab.

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## **Mpumi**

Mpumi is a 20-year-old black female who attended an “elite” school which starts at grade 10, specialises in maths and science and only admits top deserving students from other schools. She states that one had to go back to your own school if you performed poorly.

The main breadwinner is her sister who is a domestic worker and Mpumi has been living with extended family for the last 8 years.

She had access to a computer and the web at school. During her school years she had occasional access to computers at home and she currently has limited access to a Wap-enabled cell phone and laptop at home.

She has 5-6 years of web and computer experience. She spends 1-2 hours per week on the web in the lab and 30 minutes to an hour off campus at an internet café. She admits that she has only done one assignment at the internet café and mostly goes there for “other things.” However, she states that she spends much longer hours on the web when doing assignments. She indicates in her questionnaire that the web is not a big part of her life. In her questionnaire she indicates that she “manages” when looking for information and doesn’t stop trying until she finds what she is looking for. However, in the interview she expresses doubts about her searching abilities.

Fifteen percent of her web time is spent on Facebook and e-mail and the rest on assignments. She engages in self-study on the web “maybe once a week”. However, when looking at her questionnaire, it appears as if she uses much more of her web credits on material irrelevant to her studies. She indicates in her questionnaire that her four most frequent web activities are: social networking, accessing the web to check e-mail, reading the latest entertainment news and playing games.

### **Motivational processes**

#### **Goal orientation**

Mpumi does not seem to have an intrinsic goal orientation and makes no statements that could indicate that she has one. Her main motivation is to get her national diploma and not to fail and although she mentions that she loves web design, her goal orientation is focused on meeting course requirements. She repeatedly states that she does not want to fail.

She’s “not expecting to get good marks, but I’m expecting to pass. That’s what I’m working for, the pass mark.” She appears to engage in little self-instruction and only works through tutorials for “a certain thing that I need at that moment.”

#### **Task value**

Mpumi states that she likes to start her design from scratch and doesn’t like using templates for design. “If you download the templates, you never learn because you just take the code, it’s already there.

## **Control of learning beliefs/Outcome expectations**

Mpumi states that she doesn't know how she passed a certain aspect of her course because the lecturer was just "sitting there like a baby sitter." This seems to indicate that she doesn't entirely believe that the outcome of her studies is dependent on her own effort. She also indicates in more than one statement that her efforts to understand PHP doesn't help. "We keep on working, working, working but nothing comes right."

## **Self-efficacy**

She has low self-efficacy beliefs and regularly refers to not understanding or not knowing how she passes. She states "you know sometimes when you are working in groups ... you think, I'm the weakest here." She also has doubts about her abilities to find information on the web. She rates her confidence in her ability to handle difficult tasks at 5, yet also states that she is very confident in her abilities.

## **Anxiety**

She reports high levels of anxiety in terms of her studies. "It's really waking me up. I can't cope, I can't sleep." Her biggest concern is that she needs to pass. She repeatedly states that she fears failing.

## **Cognitive and metacognitive processes**

### **Rehearsal/ Elaboration/Organisation**

She takes notes if the lecturer doesn't put slides on WebCT but states that she doesn't use the notes for assignments, only in preparation for tests. She says that she doesn't try to memorise anything because "every time I try to memorise, it messes everything up.... I only memorise if I'm writing tomorrow. And then tomorrow I can copy all that."

However, when working on assignments she says that "I always have drafts for everything I do." She also states that she makes diagrams and sketches for design, but this turns out to be a requirement for the course. Students have to submit their visual diaries for marks. "Sometimes you do the visual diary at the end and then they can see you just did the visual diary now."

## **Critical thinking**

Her critical thinking skills seem to be lacking. She tries to explain what she finds difficult in the course: "PHP. And the other thing I couldn't understand was the Joomla thing. It also has some PHP in but we didn't do the PHP part. How we worked on it I still don't know."

## **Goal setting and planning**

Mpumi does not set proximal goals. Her goal is to work as a web designer in a big company. Her strategy for her studies is to get her national diploma, not to fail, and "to explore and expand more in web design. I like web design."

## **Self-monitoring**

Her metacognitive awareness is low and she describes her thoughts and what she finds difficult in vague terms. “Maybe I’m told to do this. I understand the question but I cannot apply my knowledge. It’s just difficult. If I tried, nothing works. We keep on working, working, working but nothing comes right. .... I still fail.” When asked to describe her thoughts when she engages in a difficult task, she states “The first thing that comes into my mind, I give up. But then in the end I think, okay, you are going to fail, just try and work on it.”

## **Self-judgement and self-reaction**

It is not clear against which standards Mpumi measures her work. However, her repetitive statements that’s just has to pass, creates the impression that her main concern is merely meeting course requirements.

Mpumi makes a number of statements which indicate that her self-reactions are defensive. She mentions that she doesn’t know how she passed one of her subjects because the lecturer was just like a baby sitter and “didn’t teach us anything”. She also regularly states that she would spend more time on the web and on her studies if she had access to a computer and the web at home or lived on campus. However she spends the least time on the web or in the lab of all the students interviewed. She also goes to the internet café for non-study related activities.

However, she took corrective action since first year regarding the effort she puts into her studies and the timely submission of assignments. She is able to adjust her learning to the teaching style of the lecturers but still feels that some of the lecturers are not “doing everything” so you have to self-study. She states that in previous years she was happy with the way the course was going but “this year, I thought that you have to do your own thing”.

## **Resource management processes**

### **Time and study environment**

Mpumi says that she likes working in the lab but prefers to go home early, which explains the short hours she spends in the lab. Her web time in-between assignments appear to be spent on matters unrelated to her studies. She says: “sometimes I have two weeks for an assignment and I think, I still have a lot of time. So I think just let me search or let me just send e-mails to people. Friends. And most of the time just checking the movies and the YouTube and that.”

### **Effort regulation**

Although she regularly refers to getting help from other students she also states that “if something is difficult, I won’t let go.” She will look for information on the web when “nobody knows it in class. And then I think I should just go on the web.” She reckons that this happens once a week. She has a folder with tutorials and will only go back to it when she needs a “certain thing ... at that moment. I don’t go through everything (tutorials) if I don’t think it’s necessary. “

**Peer learning and help seeking**

She sometimes asks one of her lecturers for help and appears to rely heavily on other students. She states that when we do group assignments “we work on one PC” and also makes an unguarded reference to other students helping her with assignments.

## **Vusi**

Vusi is a 23-year-old black male who attended a former Model C school. The main breadwinner in the home is an HR practitioner with a postgraduate qualification.

He had access to a computer at home from secondary school and at school from primary school. He has more than ten years experience of computer and web use. At home he has a PC and accesses the web at an internet café and through his Wap-enabled cell phone if he is not on campus. He reports that he spends 25 hours per week on the web in the lab and 1-2 hours per week off campus.

He mainly uses his cell phone for social purposes and lists the order of importance as: Music, social networking, SMSs, calls, looking for information for his studies and looking for general information. He estimates that 15-20% of his cell phone use is for multimedia purposes.

Vusi indicated in his questionnaire that he “uses the web when he has to”. This was one of the options in the questionnaire. Most other students indicated that “they are crazy about the web”. He indicated that he finds it easy to trace information on the web but asks somebody if he can’t find information immediately.

He estimates his web use as follows: 10% for self-study, Facebook and email 7%, material unrelated to his studies 5% and the rest of his web use for course related work. Although he only apportions 7% of his web time to Facebook and e-mail, he indicated in his questionnaire that he checks Facebook and his e-mail several times a day. He also indicated in his questionnaire that he reads current affairs headlines a few times a day and that he listens to music via the web every day or almost every day.

### **Motivational processes**

#### **Goal orientation**

Vusi does not seem to have an intrinsic goal orientation. Although he states that he gets satisfaction from the knowledge that he gains there aren’t really other indications that he brims with passion for the course.

Vusi is focused on meeting the requirements of the course. He also states that his goals for the next three months is to pass and pass very well. He feels that his parents’ influence helps to motivate him. “Like succeeding in life and doing my best in everything that I do.” He does not really compete with other students. He’ll check how much something else got but it’s “about me doing my best and passing. That’s the thing that I go for.” However, it is a reward for him if he received less marks than the next person but “gained more.”

#### **Task value**

Vusi feels that it is important to study all aspects of the course but admits that with some things he wouldn’t go out of his way to learn.

## **Control of learning beliefs/Outcome expectations**

Vusi wants to teach himself Java but feels that if he had the internet at home he would have gone into action. However, he forgets that he mentioned that he downloaded a lot of tutorials earlier, which he could have done at home. But he states that he can see the relationship between the effort he puts into his work and the marks he gets. He feels that he works hard but not hard enough.

## **Self-efficacy**

Vusi seems to lack self-efficacy. He feels that he is not really confident about his ability to do difficult things. He rates his general confidence in his abilities as 6 or 7 and his ability to do PHP as 5 or 6. He is worried about whether his qualification will be good enough for the workplace.

## **Anxiety**

Vusi does not seem to experience too much anxiety about his studies although he states that he has a nagging feeling that there's too much still that he has to learn in this field.

## **Cognitive and metacognitive processes**

### **Memorisation/Elaboration/Organisation**

Vusi does not really use outlines, diagrammes or summaries but takes notes in class and "test them out". He does not memorise because he tries to understand what he's studying. He also makes connections between material in class and would ask the lecturer if "this connects with what we did last year or in a previous lesson."

### **Critical thinking**

Vusi likes to find his own way of doing things. "Instead of using what the tutorials tells me, I use like alternative routes. 'Cause if my way works, it's also alright I think." He doesn't just do what the lecturers tell students.

### **Goal setting and planning**

He has set himself the goal to learn Java but has not taken any real action yet. He admits that he has lots of tutorials for different aspects of the course that he has not worked through yet. He states that he'd like to teach himself a lot of stuff that "we're not taught here" but he doesn't get to it because the course takes up most of his time.

His strategy for his studies is to tackle the most difficult things first. "It's all about the due date."

### **Self-monitoring**

He has difficulty explaining what he finds challenging about PHP but says that he doesn't always see how class work relates to reality. He is also vague in explaining what he finds challenging about Actionscript. However, he does seem to be metacognitively aware when he

works through a problem, tries to find where the problem lies and “writes down okay, this is this.”

However he makes vague statements in terms of improving on mistakes in assignments. “I tell myself okay, next one I have to do better.” He checks his assignments when he’s done and tries to make improvements before handing it in.

### **Self-judgement and self-reaction**

Vusi has taken corrective action in the sense that he now spends more time on his studies than in previous years. In previous years he would delay starting his assignments. But lately he has realised that he needs to start on assignments as soon as he gets it.

He states that if he didn’t understand something in class, he tries to solve the problem after class.

Although he sees the relation between effort and marks, Vusi blames external events on a number of occasions. He feels that if he had the web at home he would be able to work harder. He also blames some of his difficulties on a lecturer.

### **Resource management processes**

#### **Time and study environment**

Vusi at first says that he hands in his assignments on time but states later on that he sometimes falls behind with his work. He prefers to work in the lab because he has the web and other people to ask for help if he gets stuck. He listens to music while working, so as not to get distracted by noise in the lab. He feels that he has too much course work and can only “touch-up” on self-study.

#### **Effort regulation**

Vusi seems to struggle with effort regulation. “I get lazy especially with something that I’ve been looking at for over an hour on the PC. Sometimes I just want to sit back and relax and leave it for tomorrow in the lab or just ask somebody in the lab.”

#### **Help seeking and peer learning**

He states that he first asks his classmates when he has a problem and then searches the web. However, he only sometimes approaches lecturers. He also explains that they are a group of friends who work together on especially PHP. He asks others to explain the work to him and then tries to do it on his own.

When questioned Vusi elaborates on a disconcerting practise that is not particular to multimedia only. He estimates that up to 40% of the students in class can’t do PHP because they ask other students to do the work for them. But when it comes to exams, you can see who got the code from someone else. ... you can see somebody got like 60, 70% for certain things but when it comes to the exam, they get like 30%. ... Cause if you’re good in PHP you do the PHP alone. Then we design. We take a template and just add our stuff and then all pass. ... I always say the person who does the PHP and the hard work (in the group

assignment) is the one who learns at the end of the day. ” Vusi feels that he is happy if he gets 50% because he knows that he did his own work.



## Clyde

Clyde is a 22-year old coloured male student who went to a former Model C school. The main breadwinner in the home works in asset management control and has a matric qualification.

Clyde has more than 10 years of computer experience and 6-7 years of web experience. He had access to a computer at primary and secondary school and had access to a computer at home from grade 6. He now has a laptop.

He does not have access to the web at home and accesses the web at his part-time job, an internet café, at a friend's house and through his Wap-enabled cell phone.

He uses the web for 3-4 hours per week in the lab and an additional 1-2 hours per week off campus. He reports going home or to the lab after class.

His main use of his cell phone is social and he rates this use in order of importance as follows: calls, SMSs, music, social networking, help with assignments and looking for general information like news or sports.

Clyde reports that 40-45% of his web use in the lab is spend on e-mail and Facebook and another 10% on looking for information that is not related to his studies. He is not really able to give an estimate of how much of his web time is used for self-study or for problem-solving but he says that he does not happen "very often".

In his questionnaire, he indicates that it is very easy for him to find information on the web but that he tries for a while before stopping. In his interview he declares, "I don't really like searching because especially when I search for code I find it complicated ... I would do it but sometimes it takes me a while and I get frustrated and then I just ask someone. ... I don't really like using the internet 'cause it's very big."

### **Motivational processes**

#### **Goal orientation**

Clyde does not seem to have an intrinsic goal orientation. He declares his love for PHP because he likes logical thinking and states that he has a hunger to learn. However, later in the interview he states that if he had a choice he would do Java rather than PHP because Java is easier. "Because I've got a diploma in PHP, I feel that's what I should do and its also part of programming." His lack of time spend on the web to further his knowledge on his studies casts doubt over his statement that he has a hunger to learn.

He admits that is important for him to get higher marks in PHP than his classmates. "I think it's also the feeling I get when I get it done, I know it was so hard nobody else could do it but I got it done."

He also sees his studies as a means to an end. "What motivates me is knowing that I have an ideal in my life. What motivates me is that perception of where I see myself in ten years with a nice house, a nice car, or my family."

## **Task value**

In terms of outcome expectations, he does not see the value of everything in the course. He states that “I see myself in PHP but I have to pass design to get my diploma and sometimes I feel I don’t see why I need to do design because I don’t wanna pursue a career in it. But I have to do it to get my diploma.” Throughout the interview, he regularly refers to his lack of interest in design and how he does not spend much time on it.

## **Control of learning beliefs/Outcome expectations**

Although he does not like using the internet – “it’s too big” – he feels that he could do better in his studies if “I had internet access at home, I think I’d have more time to finish my assignments and juggle everything.” Clyde therefore believes that his achievements are partly dependent on whether he has the web at home or not.

Yet, he is also able to see that outcome depends on effort and input. He evaluates himself as average in terms of the effort he puts in because he can be “really lazy” at times when it is something he doesn’t enjoy but he “can do hard work” when it’s something he enjoys. ... I feel I can put more time in it and I feel I need to put some more time in. Definitely.”

## **Self-efficacy**

Clyde has fairly high self-efficacy beliefs when it comes to PHP. “I’m like an analytical thinker. Give me numbers and digits and letters and then I can code for you.”

However, when it comes to design, his self-efficacy levels are low. “I just don’t feel that I’m creative. I can’t start something from scratch. ... That’s why I rather work off templates. It’s easier. Then I don’t design. I just throw in whatever.”

Although he rates his belief in his ability to handle difficult tasks as 8 or 8.5 he expresses fears about his skills level when he has to start working. “I believe it’s in me. I just hope I’ll find an employer ... that’s willing to sit down with me and help me where I need help because that’s a worry for me”.

## **Anxiety**

Throughout the interview it is clear that he experiences high levels of anxiety and he regularly refers to “getting stressed out” “I fear a lot that there’s something I won’t be able to do. I won’t be able to do in time.” He talks about his high stress levels so often that one gets the distinct impression that it impedes his functioning.

## **Cognitive and metacognitive processes**

### **Rehearsal/Elaboration/Organisation**

Clyde does not use summaries and does not engage in generative note taking if the lecturer is going to put work on the learner management system. He feels that “you can get behind when you write things down”. When asked whether he uses outlines he replies pertinently. “No, I don’t”. There are also no indications that he organises his work.

## **Critical thinking**

He reports that he is able to think critically when in class. “I might find connections, like (lecturer) told us about extensions that we can make for Joomla in PHP and I would end up thinking ... what kind of extensions we can make. Then I’m thinking maybe a date and time, then I start thinking how would I create that?”

But when trying to explain what he finds difficult about Joomla he states: “It gets confusing. Because you’ve got so many extensions that you can add on. You need in-depth knowledge on it to really, really understand it with creating the articles and the whole pages and things and the menu. You don’t really understand what you’re doing, all you know is how you create a menu. So I don’t really know why I’m doing it, I’m doing it because I was told to do it.”

## **Goal setting and planning**

When asked about his goal for his studies he declares that it is to be more proficient in PHP but he sets a distal goal for himself. “I feel I want to go and get work experience and then do that at work, learn more.” In the longer term he wants to become a focused developer and become a senior developer and basically be in charge of the juniors and teach them things.”

At one point in the interview, it does appear as if he has a proximal goal and some plans in place. He plans to work on his content management system during the June holidays. However, he foresees a problem in that the lecturer will have to help him but the lecturer will also be on holiday. He also foresees that he will only get up to a point and then get two fellow students to help him because they are more proficient in Flash. “...I’m going to get all my things together and ask one of them to help me. But the rest of the things I would handle as soon as I get a chance.” He refers more than once to working on his studies “when he gets a chance”.

He also doesn’t plan an assignment or task. He says that “... sometimes it does help but I just feel like sometimes ends up being long. ... If I’m in the lab I would use from the internet and grab the info that I can get.”

Although he states that he tries to do his work as soon as possible, he mentions that “maybe I sit at home and I have time and I might as well do it” or “...see when I get a chance to do it”. When it is something he enjoys like PHP, “I definitely try and get cracking on that as soon as possible.”

## **Self-monitoring**

When done with assignments he is usually satisfied and does not revise what he has done. However, he makes some effort to get clarity on matters he does not understand. He asks a classmate “and then maybe he can explain it to me. But if I don’t understand and we get around to a test or something ... Then I’d go onto WebCT and copy down the notes and slideshow and then read through it, to make myself understand it a bit better.” He therefore postpones getting clarity on matters he does not understand.

When working through a tutorial, he states that “sometimes I’ll go back if it’s not working exactly as it’s supposed to see if it’s something I did wrong. However, he doesn’t do cross

checks with other material and would “rather ask somebody whose got it going.” Or “I’d try and figure it out myself but I don’t usually google it because it could end up making it looong.”

When trying to establish his metacognitive awareness he was asked to describe why he finds PHP difficult. He uses vague terms when explaining. “.... PHP is very, very tricky. There are so many ways to do one thing, so many right ways and so many wrong ways. So with my CMS I’m constantly thinking how can I make this better? What is the problem? What if I do this, what if I do that?”

When asked to describe his thoughts while he is busy with something difficult or challenging, he replies “I’m usually, jo, I’m tired, I wanna go sleep but it kind of depends on what I’m doing. ... when its something like coding I try to figure out what is going on. Why is it doing this and why is it so difficult? .... but what goes through my mind (is) whether I should keep sticking to this now, whether I should phone somebody, whether I should google it or whether I should just leave for another time or ask the lecturer or something. Those are all my options that I think up and then I think what am I gonna do.” He therefore seems to engage in a battle with himself rather than trying to solve his actual problem.

### **Self-judgement and self-reaction**

Clyde is very proud of his achievements in PHP and appears to have a real interest in this part of his studies despite his statement that he would have preferred to learn Java because it is easier. There is evidence that he measures his standards against his class mates’ performance when he states how good it feels to be able to do what his classmates can’t do in PHP. However, he also measures his design skills against those of his classmates and is frustrated by the fact that he just can’t design.

There is little evidence that Clyde takes corrective action after observing and evaluating his actions. Throughout the interview, it is appears as if he analyses his actions and emotions and he tries to protect himself. He regularly seems to justify his lack of action to solve problems or control his efforts by saying that “it gets too long”, or it gets confusing”, or it is “too big” (the web).

### **Resource management processes**

#### **Time and study environment**

He struggles with time-management and makes regular references to “getting stressed out” when time is limited. This is also why he rather asks somebody for help than search on the internet because searching on the internet “can get loooong”. He reports that he sometimes has to play “a bit of catch-up with assignments”

He prefers working in the lab because “you’ve got all the resources at your disposal. You’ve got your classmates, you’ve got the lecturers, and you’ve got the internet. He reports being able to deal with distractions such as classmates asking for help with PHP. He uses earphones to deal with noise levels.”

## **Effort regulation**

He gets frustrated and gives up easily. "I don't really like searching because especially when I search for code, I find it complicated because it's not always exactly the way you want it ... I get frustrated and then I just ask someone. It's usually easier for me to ask somebody."

Or he states "I actually tried to work through one (tutorial) recently but then it got tricky ... I couldn't go further because I didn't understand it further. So I stopped it at that."

When asked whether he loses interest in class because the topic is too easy or difficult he declares. "Sometimes when it gets difficult, when it's easy it's not really that bad. I would stop focusing but I know I can do it so I don't stress. Usually when it's hard and then I get sidetracked and then I just stop because I don't know what's going on anymore."

He also states that because of his lack of interest and ability in design, he does not put effort into it.

## **Peer learning and help seeking**

He regularly refers to asking classmates for help or discussing work with classmates but there are indications that this form of peer learning is detrimental to his learning.

He sees group work as follows : "when I work with A and B it's more of like, you do this part, you do this part, I'll do that part, we don't really discuss ... we throw it all together and we don't really understand what each other threw in. ... It's not really like a group assignment so that I sometimes feel isn't really right. But I just do it because I need the assignment."

## **George**

George is a 20-year old coloured male who went to a traditionally coloured or former HoR school. The main breadwinner is a general manager at a small company and has matric. George has a part-time job over weekends. After class he goes home.

George had access to a computer at home and at school since primary school, has 9-10 years of experience with computers and 4-5 years of web experience. He does not have web access at home but has a PC. He spends 5-6 hours per week on the web in the lab and 1-2 hours per week off campus, where he accesses the web through his cell phone and an internet café.

The main use of his cell phone is social and he lists his usage as calls, SMSs, looking for information to help him with assignments, looking for general multimedia info and social networking, in order of importance. He estimates that 20% of his cell phone use is for multimedia.

He “manages” when looking for information on the web and he doesn’t stop searching until he finds the info he needs. He indicates that he is “crazy about the web”.

George estimates that 40% of his web credits is for Facebook and e-mail and 10% for information not related to his studies. Forty percent of his web use is for assignments and class work and 5-10% for self-study. He associates the web firstly with social networking and “after that it’s research and assignments.”

He indicates in his questionnaire that he goes home after class is over.

### **Motivational processes**

#### **Goal orientation**

His learning goal orientation is geared to passing the course and his statements do not indicate an intrinsic interest in the course as a whole. However, he “loves” Flash and regularly refers to self-study in this regard. He regularly states that when he has a lot of work he just wants to get it done. He states that his motivation for his studies is that he wants to start a family, doesn’t want to struggle with money and wants to stand on his own feet and be independent of his parents. The fact that his parents want him to succeed also motivates him.

#### **Task value**

When asked whether it is important for him to learn everything and understand everything on the course George replies that “you can leave out some stuff that’s not important or something you know you’re not going to use one day.” He also makes reference to “just read the stuff on the internet, maybe copy and paste info.” He regularly refers to getting bored in classes.

### **Control of learning beliefs/Outcome expectations**

He attributes low marks to own effort and feels “lecturers are always fair in how they mark you.” George expects “mostly average marks and in some subjects “good enough for me”, which seems to indicate that he is not aiming very high.

### **Self-efficacy**

On the surface, his self-efficacy beliefs seem fair but there are statements that indicate that his confidence comes from the availability of help from others. He feels confident about starting to work because there will be people to help him. He also states that he always works on other people’s opinions. He feels that most of the time when he is done with an assignment, he thinks that he should have done stuff differently. He rates his confidence in his abilities at 7 1/2, 8.

### **Anxiety**

He doesn’t seem to experience too much anxiety about his studies except to say that when there is a lot of work, he just wants to get it over with.

### **Cognitive and metacognitive processes**

#### **Rehearsal/Elaboration/Organisation**

He takes notes but this does not seem to be generative because he does it when “the lecturer says that something is important.” He keeps the notes for assignments but also to see what was done on a particular day. He feels it’s not really necessary to plan an assignment because the briefs that they get are very specific. But he first draws pictures when he designs, which is a requirement for the course because the students have to submit visual diaries.

#### **Critical thinking**

Even with regular prompting, there doesn’t seem to be an indication that George thinks critically about the course and his work.

#### **Goal setting and planning**

He sets distal goals for himself (he wants to start a family and be independent). Or makes vague statements about his goals. “It’s just to better myself in what I do and just to get more on how stuff works in Flash because I like Flash a lot.” He does not have a clear strategy in place for meeting his goals. His strategy for his studies in general is “determined by what assignments we get, how difficult it is and do the assignments as fast as possible, just to get it done.” He also makes regular reference to “when I get a chance” or “when I get free time”.

#### **Self-monitoring**

His metacognitive awareness is low and his descriptions of thought processes are superficial and vague. When describing his difficulties with Flash he states that “it’s almost like maths, you have to practise, practise, practise.” Or: “I first think of what the end-product must look

like. Or what it's supposed to do and then I'll look at what's the first step. And then afterwards I'll do every step, step by step."

However, there is no evidence that he measures his performance against some standard or that he tries to improve on previous efforts. In terms of evaluating himself he feels that in some subjects he must do more work.

He makes a number of defensive self-reactive statements. Of all the students interviewed, he spends the third least time on the web (5-6 hours per week) of which just more than half is for social networking and activities not related to his studies. Yet he feels that if he had web access at home he would have spend more time on his studies. He also feels that he does not get enough time to practise because he has too much other work. He also feels that he falls behind with work because of a large number of assignments and tests. George states that he works better when he is under pressure.

## **Resource management processes**

### **Time and study environment**

His time management skills seems weak and he contradicts himself in terms of handing in assignments on time when he says that he almost never hands in late. He listens to "soft rock" while working because it relaxes him but he uses music to shut out noise when he works in the lab. He prefers to work at home in the evenings "when everything is calm in the house."

### **Effort regulation**

He often admits to loosing interest in class because the classes are too long. He also does not seem to try very hard when he has a problem but prefers to ask classmates.

### **Peer learning and help seeking**

His peer learning seems to centre around help seeking and this is also his first port of call when he struggles with a problem. He seems to depend strongly on help from others. There is no clear evidence that he engages in a lot of information-seeking or self-instruction, except for his activities surrounding his interest in Flash. He "almost never" approaches lecturers for help although he says that lecturers regularly encourage students to ask for help.



## Appendix 4

P.O. Box 1765  
Sun Valley  
7985  
28 April 2010

The Deputy Vice Chancellor: Academic  
The Dean: Faculty of Informatics and Design  
The HOD: Informatics and Design  
The Domain leader: Multimedia Programme  
[Name deleted]

Dear Professors [Names deleted]

### ***REQUEST FOR PERMISSION TO CONDUCT RESEARCH***

I hereby request permission from you to conduct research with the 2010 3<sup>rd</sup>-year Multimedia students at [Name deleted].

The reason for this request is that I need to do research for a minor dissertation as part of my postgraduate studies at the University of Cape Town. I hope to complete my M.Phil, specialising in ICTs in Education, at the end of 2010. The first part of my studies consisted of a coursework Postgraduate Diploma and I completed the four required modules, as well as a fifth module. These are:

- ICTs in Education: Issues and Debates
- Learning, Cognition and Technology
- Learning and Teaching in Higher Education
- Globalisation, Universities and Academic Work
- English as Additional Language in Schooling

I have also completed the Research Methodology module, which is a prerequisite for the Minor Dissertation.

My supervisors for this research are the director of the Centre for Educational Technology at the University of Cape Town, Dr Laura Czerniewicz, and Ms Cheryl Brown, a researcher at the centre and lecturer on the masters programme.

The main focus of my research will be: 3<sup>rd</sup> year Multimedia students' voluntary use of the world wide web (WWW) and to this end I will ask the following questions:

- To what extent do students enrolled in an IT-related course such as multimedia use the WWW voluntarily and in a self-regulated manner to supplement and enhance their formal course knowledge and skills
- Which factors determine an individual students' voluntary use of the WWW for learning in a self-regulated manner?

The application of Albert Bandura's Social Cognitive Theory to an education context will form the main theoretical basis of this research. Of particular interest for this research is the social cognitive view of self-regulation for learning. A number of scholars have contributed to this field, including Barry Zimmerman, Dale Schunk and Paul Pintrich.

The rationale for this research lies in my work with 3<sup>rd</sup>-year Multimedia students and in particular the observation that students who report using the web in the above manner excel in the workplace during their experiential learning period, especially in relation to their critical thinking and problem-solving skills, their ability to engage in higher level duties and their ability to secure permanent employment on completion of their studies. On the advice of my supervisors, the experiential learning period of Multimedia students will not form part of the research study but I hope to conduct research into this aspect at a later stage. I also hope to build aspects of this research study into the Work Preparedness Skills Development module. A summary of the research will be made available to the Multimedia programme.

The research will consist of a questionnaire, which the 3<sup>rd</sup> year class will be asked to complete on a voluntary basis. Students can remain anonymous or provide their names. Students who are willing to give their names

will be asked to volunteer for face-to-face interviews. A total of 6 – 8 students will be involved in the interviews, should they agree.

Students will be given an information sheet which sets out the purpose of the research and a guarantee of confidentiality. Students who agree to take part in face-to-face interviews will also be asked to sign a consent form.

For the completion of the class questionnaire, I would like to request permission from [names deleted] to use 2 periods of the Work Preparedness Skills Development class during the 2<sup>nd</sup> term. The face-to-face interviews will be conducted outside of class time and at a time suitable to the students.

I would like to give the assurance that the reputation of [name deleted], the Faculty, the IT department and the Multimedia programme will not be tarnished in any way because the focus of the study is individual students' self-regulated behaviour in relation to the WWW. The identity of students will also be kept totally confidential and pseudonyms will be used where applicable.

Should you wish to meet with me personally to discuss further details, I will be available at any time, except for scheduled class periods for [details deleted].

I trust that you will consider my request favourably.

Yours sincerely

Hannelie Swanepoel  
Co-op Coordinator: [Details deleted]

## Appendix 5

### INFORMATION SHEET

You should please read this sheet before completing the questionnaire

Dear Student

I am busy with the last part of my studies for the M.Phil. degree, specialising in Educational Technology. For this part of my studies at the University of Cape Town, I need to conduct research, which will form part of a minor dissertation, or mini-thesis. My research study is supervised by two of my lecturers at UCT, Dr Laura Czerniewicz, who is the director of the Centre for Educational Technology at UCT, and Ms Cheryl Brown, who is a researcher at the Centre and a lecturer on the masters programme.

#### Permission for this research

I have received permission from the Faculty of Informatics and Design, the Department of Information Technology and the Multimedia Technology Programme to conduct this research. I have also received approval from the research ethics committee of the faculty to ensure that this research is done in an ethical way.

#### The focus of the research

The main focus of this research is to find out how 3<sup>rd</sup>-year students in an IT-related course such as Multimedia Technology use the world wide web (WWW) voluntarily to help them with their studies. As part of this research, I will also try to find out which factors determine your voluntary use of the web, especially in relation to your view of your studies and your approach to your studies.

#### Voluntary participation

Your participation in this research is voluntary, which means that you do not have to take part if you do not want to. There will be no discrimination of any kind if you choose not to take part. However, to ensure that the research is as reliable and comprehensive as possible with regard to a 3<sup>rd</sup>-year multimedia class, it would be appreciated if you take part.

#### What will be expected of you?

Students who agree to take part will be asked to complete a questionnaire about your access to and use of the world wide web. You can complete the questionnaire anonymously, which means that you do not have to write your name on the questionnaire if you don't want to.

A few of the students who don't mind giving their names, will also be asked to volunteer for face-to-face interviews about their use of the web for their studies.

#### How will this information be used?

The information from the questionnaire and interviews will be used in the minor dissertation but without mentioning any names or giving any information which will make it possible to identify you. The dissertation will be read by my dissertation supervisors at UCT, as well as independent examiners. A summary of the findings of this study, will also be made available to the Multimedia programme to give them more insight into students' use of the WWW. Again, nobody in this study will be identifiable.

If you volunteer for a face-to-face interview, I will use a pseudonym or fake name to refer to you in the study. If you choose to write your name on the questionnaire or volunteer for a face-to-face interview, nobody else, including your lecturers, will be given any information relating to you as an individual.

#### How can I guarantee your confidentiality

UCT and other Higher Education Institutions have very strict ethical codes on the conducting of research and the use of information from research studies. Therefore, it is essential that I keep your name and identity confidential because I will not be able to get my degree if I break the confidentiality agreement!

You must please keep this information sheet with you. If you have any questions or concerns about your participation in this study you can contact me at the number below or you may e-mail me.

Kind regards  
Hannelie Swanepoel  
[Details deleted]  
e-mail: [Details deleted]  
[Details deleted]

## CONSENT FORM

**Researcher Name** : Hannelie Swanepoel  
**Name of University** : University of Cape Town  
**Name of my institution** : [Name deleted]  
**Address** : [Details deleted]  
**Phone** : [Details deleted]  
**e-mail** : [Details deleted]

Thank you for agreeing to participate in this study.

This form outlines the purpose of the study and provides a description of your involvement and rights as a participant.

### Purpose of the study

This study is being conducted in partial fulfillment of the M.Phil. in Education by coursework and minor dissertation at the University of Cape Town.

The purpose of this study is to examine Multimedia students' voluntary use of the World Wide Web to help them with their studies. The study will attempt to answer the following questions:

- To what extent do students enrolled in an IT-related course such as multimedia use the web voluntarily and in a self-regulated manner to supplement and enhance their formal course knowledge and skills
- Which factors determine an individual students' voluntary use of the web for learning?

### Methods of Data Collection

I plan to conduct a survey of the 2010 3<sup>rd</sup>-year Multimedia class with the permission of students and conduct interviews with a sample of students from this class.

I would like to record these interviews with your permission. Sections of the audio recordings might be transcribed where applicable but notes will also be taken.

You are encouraged to ask questions at any time about the nature of the study and the methods being used. You may contact me at any time at the e-mail address/phone number listed above.

I will use the information from this study to write my minor dissertation. The dissertation will be read by my supervisor, co-supervisor and external examiners.

I guarantee that the following conditions will be met:

1. Neither your name, nor that of the institution will be used at any point of information collection. All persons and organisations will be given pseudonyms.
  2. If you grant permission for audio recording, no audio recordings will be used for any purpose other than to do this study. I will be the only person listening to the recordings. The recordings will be destroyed after completion of the study.
  3. Your participation in this research is voluntary and you have the right to withdraw at any point, for any reason, and without any prejudice.
- 

Do you grant permission to be quoted directly but without your real name being use?

Yes \_\_\_\_\_

No \_\_\_\_\_

Do you grant permission to be audio-recorded?

Yes \_\_\_\_\_

No \_\_\_\_\_

If necessary at all, can I contact you for follow-up questions via e-mail?

Yes \_\_\_\_\_

No \_\_\_\_\_

I agree to the terms

Respondent \_\_\_\_\_ Date \_\_\_\_\_

I agree to the terms:

Researcher \_\_\_\_\_ Date \_\_\_\_\_